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A National Newspaper for Every Branch of the Industry

Automotive Daily News

CARS · SHOP EQUIPMENT · TRUCKS · AVIATION · PARTS · ACCESSORIES · TIRES

Vol. 11. No. 1509 — Entered as second-class matter Aug. 27, 1925, Post Office, N. Y., N. Y., Under Act of March 3, 1879. — NEW YORK, FRIDAY, JULY 10, 1931 — 5 Cents. $12 Per Year

Willys-Overland Gives Full Specifications of New Willys-Knight 95

Four-Body Types on 113 W. B. Offered at Base Price of $845; Six Port Intake Manifold and Optional Free Wheeling Featured

TOLEDO, O., July 9.—The Willys-Overland Company today made public details of the new 95 Willys-Knight line, the coming of which was first announced in the Automotive Daily News on July 1. At the base price of $845 for the coach, this is the lowest-priced Knight-engined car ever offered by Willys-Overland.

The complete line includes, in addition to the coach, a sedan, Victoria and coupe with rumble seat, all mounted on 113 w. b. chassis. Free-wheeling is offered as an option at a slightly higher price in common with all Willys-Overland lines.

Other features of the new model include a double-drop frame, six-port intake manifold and a new

(Continued on Page 12)

NASH EARNINGS INCREASE; TO PAY $1 SHARE DIVIDEND

Kenosha, Wis., July 9.—At a directors' meeting of the Nash Motors Company held yesterday at the offices of the company here a dividend of $1 per share was declared payable on August 1 to stockholders of record at the close of business July 20.

The balance sheet and earnings statement for the second quarter, which includes the months of March, April and May, was presented, showing cash and government securities in the company's treasury amounting to $34,692,182.31. The company earned during the quarter $1,260,573.65 after deducting all expense of manufacturing, selling and administration, and providing for depreciation and both state and Federal taxes.

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CORRECTION

In reporting General Motors June sales yesterday a statement was made to the effect that "actual sales by dealers to consumers fell 3,033 units short of the sales by the corporation to its dealers." Exactly the opposite is the case. General Motors sales to its dealers fell 3,033 units short of the actual sales by dealers to consumers during the month of June.

N. A. C. C. Estimate Places June Production at 254,760 Units

NEW YORK, July 9.—The National Automobile Chamber of Commerce today released its estimate of June, 1931, production, the total being 254,760 vehicle units. Our readers will recall that on July 1, Automotive Daily News after a survey by telegraph, estimated June production at 250,000 units.

The June production total, 254,760 vehicle units compares with 327,000 in May, 1931, and with 349,000 in June, 1930. The decrease in June was 22 per cent. under May and 27 per cent. under June last year.

With this June output total in hand, we find that the total production for the industry during the first half of 1931 was 1,632,971, compared with 2,304,363 in the first six months of 1930. The decrease here was 29 per cent. under the first half total last year.

Readers of Automotive Daily News will recall that on July 8, this newspaper estimated production for the first half of 1931 at 1,633,698, less than a thousand units from the N. A. C. C. estimate as presented above.

TIRE SHIPMENTS IN MAY GAIN 9.8% OVER APRIL; TOP 1930

New York, July 9.—Shipments of pneumatic casings for the month of May amounted to 5,415,171 casings, an increase of 9.8 per cent. over April this year, 3.8 per cent. over May 1930, and 6.8 per cent. more than usual seasonal increase of 3 per cent., according to statistics released by the Rubber Manufacturers Association, Inc., today.

This organization reports production of pneumatic casings for May to be 5,678,754 units, an increase of 14.9 per cent. over April this year, although showing very little change as compared with May a year ago.

Pneumatic casings on hand May 31 amounted to 10,312,320 units, an

(Continued on Page 2)

AUBURN EARNINGS EQUAL $11.06 SHARE IN SECOND QUARTER

Auburn, Ind., July 9.—Auburn Automobile Company and its subsidiaries for the months of March, April and May, comprising the second quarter of the current fiscal year ended May 31, 1931, earned consolidated net profits of $2,158,764.98, equal to $11.06 a share on 195,234 shares outstanding on that date.

This compares with net profits of $769,385, equal to $3.94 a share, for the like period of 1930, and compares with $1,312,934, equal to $6.72 a share, for the like period in 1929, based on the present capitalization.

For the first six months ended May 31, 1931, consolidated net profits were $2,361,175, equal to $12.09 per share, as compared to $866,009, equal to $4.44 a share in 1930, and compares to net profits of $1,827,507, equal to $9.36 a share, in the first six months of 1929. The consolidated balance sheet of the company, and its subsidiaries, as of May 31, 1931, shows current assets of $16,235,898, of which $6,698,642 are in cash and government securities. Current liabilities amount to $4,460,378, giving a net current ratio of 3.64.

Net quick assets per share amount to $60.31, and book value per share $85.40.

E. L. Cord, chairman of the board, in a brief statement, said: "Even more important and gratifying than

(Continued on Page 2)

STUDEBAKER CORP. SALES GAIN IN SECOND QUARTER

South Bend, Ind., July 9.—Sales of the Studebaker Corporation in the second quarter of 1931 totaled 18,037 cars, against 16,472 in the like 1930 quarter, an increase of 1,565 cars, or 9.5 per cent.

These figures do not include Pierce-Arrow sales.

The second quarter's increase more than offsets the decrease in unit sales in first quarter and enabled Studebaker to finish the first half with sales in excess of the corresponding 1930 period.

June sales were 4,716 cars, against 6,225 cars in May and 5,139 cars in June, 1930.

LEADERS SEE DEBT RECESS REAL TRADE STIMULANT

NEW YORK, July 9.—That the Hoover international debt moratorium plan will have far reaching effect in stabilizing the world markets and will indirectly operate with benefit to the American automobile industry both here and abroad is the opinion expressed by trade leaders who, so far, have answered the Automotive Daily News survey on this question.

While the general opinion is expressed that the most immediate benefits to the American automobile manufacturers will be derived from the export markets, it is also felt that the stabilization of these markets will greatly strengthen world trade as a whole and will eventually favorably affect the domestic markets as well.

The view is expressed by W. S. Knudsen, president of the Chevrolet Motor Company, who in one part of his statement says: "The outstanding lesson of the world economic crisis is that no nation can continue to accumulate wealth in an otherwise impoverished world. Regardless of political boundaries, nationalistic aspirations, or differences in form of social organization, recent events have demonstrated that the civilized world is a single, closely integrated, economic unit, of which our country is but one of the

(Continued on Page 2)

Late News Flashes

Milwaukee, Wis., July 9.—The Waukesha Motor Company has started production on a small gas engine developing 15 horse power. Aschedule of 4,000 units embracing all types of engines has been set for July. It is announced that June and July business to date has shown the first gain over 1930.

* * *

Kearny, N. J., July 9.—H. B. MacLaughlin, formerly with sales promotion department of Vacuum Oil, has been appointed sales manager of the Emark Battery Company of this city, a division of Thomas A. Edison, Inc.

* * *

Berlin, Germany, July 9.—The number of unemployed in Germany on June 30 was 3,962,000, a drop of 38,000 in two weeks.

* * *

Montreal, Canada, July 9.—Sir Charles Gordon, president of the Bank of Montreal, today said the business conditions in England are improving steadily. He further stated that conditions there are not as bad as they are in the United States.

TODAY

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This dealer uses service salesmen successfully .....Page 3
Ford dealer convinces on resale value as basis for selling service .....Page 3
Editorial: "There Are Others," Page 4
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Road builders' president urges increased highway appropriations, Page 5
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Cumulative June new commercial car registrations.....Page 7
Major specifications and mechanical details of commercial cars, Pages 8, 9, 10

300 Members to Attend Maryland Trade Meeting

BALTIMORE, Md., July 9.—Approximately 300 dealer members are expected to attend the annual meeting of the Automobile Trade Association of Maryland which will be held Monday and Tuesday, July 13 and 14, at the George Washington Hotel, Ocean City, Md.

In addition to an interesting and instructive business program the committee has arranged an entertaining program of sports and fun making aimed to lighten the more serious part of the meeting.

Among the prominent personages who will be in attendance at the meeting are: Gov. Albert C. Ritchie of Maryland; Harold G. Hoffman, commissioner of Motor Vehicles in New Jersey; Benjamin G. Eynon, commissioner of Motor Vehicles in Pennsylvania; E. Austin Baughman, commissioner of Motor Vehicles in Maryland and Strickland W. Gillilan, Washington, D. C.

One of the highlights of the meeting is expected to be the paper presented by Thomas W. Wilson, of the Wilson Nash Company, Baltimore, on Monday outlining "The Dealer's Real Problem and Its Answer." This paper is expected to arouse considerable discussion, and many helpful hints on the present situation are expected to be brought to light.

The complete program for the two-day session is as follows:

Monday, July 13

9.00 A. M. to 2 P. M.—Registration of members, visitors and guests. Lobby, George Washington Hotel.

2.30 P. M.—Convening of convention. A. H. Bishop, president Automobile Trade Association of Maryland.

2.45 P. M.—Address of welcome, William M. McCabe, mayor of Ocean City.

3.00 P. M.—"Legal Pitfalls for the Automobile Dealer," E. Allan

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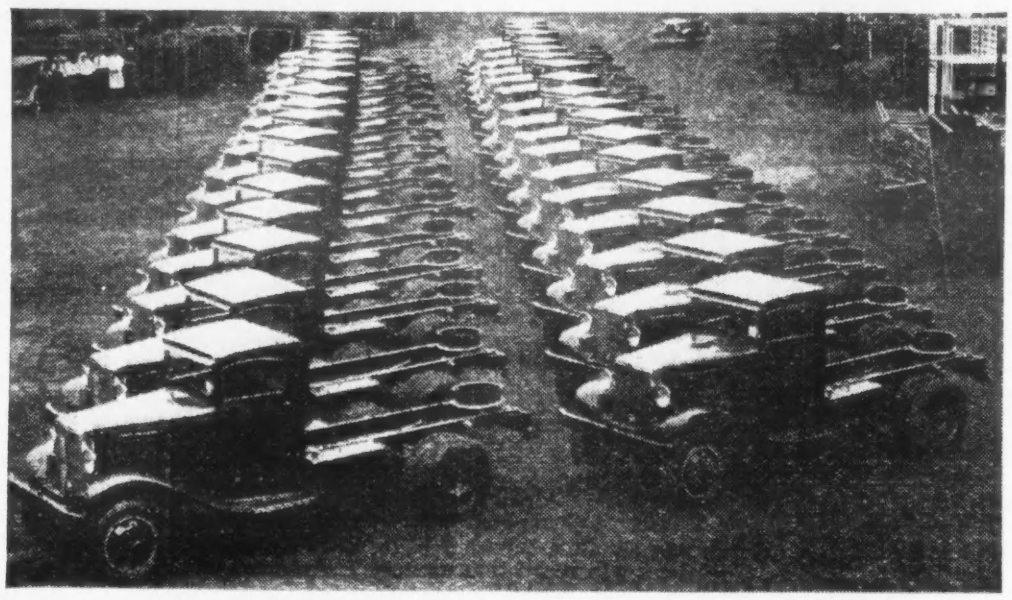
Are Dash Instruments a Danger Factor?—See Page 5

Marmon Trucks for the Army



A VIEW of the thirty-three four-wheel drive Marmon-Herrington trucks delivered to the government for use as refueling units at United States Army air fields

Leaders See Debt Recess Real Trade Stimulant

(Continued from Page 1)

many interdependent parts. America cannot prosper alone."

Norman De Vaux, president of the De Vaux-Hall Motors Corporation, says:

"The debt moratorium will have an immediate stimulative effect on business in general in my opinion. This master stroke should prove to be a healthy stabilizer to American industry. As a consequence the automotive world will soon feel the renewed animation of strengthened confidence."

Roy D. Chapin, chairman of board, Hudson Motor Car Company: "President Hoover's moratorium has created a new feeling of confidence throughout the entire world. Since 1929 it is the first outstanding international stimulus, which, doubtless, will be followed by others soon. The motor industry is bound to share in the increased buying; the results are already noticeable."

Mr. Knudsen's complete statement is as follows: "I believe export business should be improved, but domestic business will not be affected.

"The outstanding lesson of the world economic crisis is that no nation can continue to accumulate wealth in an otherwise impoverished world. Regardless of political boundaries, nationalistic aspirations, or differences in form of social organization, recent events have demonstrated that the civilized world is a single, closely integrated, economic unit, of which our country is but one of many interdependent parts. America cannot prosper alone.

"It is now apparent that Germany, under an unbearable burden of reparations, was facing not merely an economic crisis, but complete collapse, which might easily have precipitated political, and perhaps social, chaos. The intricate structure of reparations and war debt payments would have served as an effective medium to communicate destructive effect almost instantaneously to other European countries.

"To avert the impending crisis in Europe, prompt action was necessary—action only America could take. Courageously disregarding all considerations of partisan politics and narrow-minded nationalism, President Hoover, at one stroke, has swept aside the atmosphere of doubt which has been threatening international good will and slowly strangling trade between nations. He has recognized that world conditions must be considered from a world viewpoint economically. He has brought not only a practical stimulant, but a psychological tonic to an economically sick world.

"In foregoing for one year the payment of principal and interest on war debts owing to us, we are proceeding on the soundest possible basis—that of enlightened self-interest. President Hoover's statement is a notable contribution toward thinking out world economic problems in terms of economics rather than permitting them to become befogged by partisan politics. If the same wisdom and courage can be applied to other intergovernmental problems which have aggravated and prolonged the present world economic crisis, there is good ground for belief that the turning point is at hand.

"Naturally, the automotive industry will benefit greatly. Its export structure is built upon a solid foundation and it is in a position to capitalize almost immediately on the world trade that has been stimulated by the successful outcome of the moratorium negotiations."

L. A. Miller, president Willys-Overland: "Debt moratorium should have most salutary effect upon both domestic and export business. If closely followed by disarmament as proposed by President Hoover and bountiful crops there should be a decided upturn in general business."

TIRE SHIPMENTS IN MAY GAIN 9.8% OVER APRIL; TOP 1930

(Continued from Page 1)

increase of 2.8 per cent. over April, although 23.2 per cent below May 31, 1930.

The actual figures are as follows:

PNEUMATIC CASINGS

Shipments	
May, 1931	5,415,171
April, 1931	4,931,906
May, 1930	5,216,471
Production	
May, 1931	5,678,754
April, 1931	4,944,363
May, 1930	5,717,369
Inventory	
May, 1931	10,312,320
April, 1931	10,031,419
May, 1930	13,431,736

AUBURN EARNINGS EQUAL $11.06 SHARE IN SECOND QUARTER

(Continued from Page 1)

the improvement in financial condition of the company itself, over like periods in the past, has been the advance of the company from twenty-second place a year ago to an established position well within the first ten producers in the industry, in May of this year."

300 Members to Attend Maryland Trade Meeting

(Continued from Page 1)

Sauerwein, counsel Automobile Trade Association.

3.45 P. M.—"The Dealer and the Save-a-Life Campaign," D. A. DeLashmutt, president Montgomery County Motor Company, Rockville.

4.00 P. M.—"Training the Salesman for More Sales," K. A. Ridenour, director of sales Dodge Brothers Company, Detroit, Mich.

4.45 P. M.—"The Dealer's Real Problem and Its Answer," Thomas W. Wilson, Jr., president Wilson Nash Company, Baltimore.

5.30 P. M.—Ocean bathing.

8.00 P. M.—Fun, frolic and frills.

Tuesday, July 14

10.00 A. M.—"The Dealer's Outlook and Opportunity," Leon Bannigan, editor Motor World, Wholesale, Philadelphia, Pa.

10.30 A. M.—"Giving Away Net Profits," Leo Jordon, president Leo Jordon Motor Company, Baltimore.

10.45 A. M.—"How Legislation Helps," James J. Lindsay, floor leader Maryland House of Delegates.

11.00 A. M.—"The Factory and the Dealer," George M. Graham, vice-president Willys-Overland Company, Toledo, O.

11.45 A. M.—"Make Sales Produce," Harry G. Moock, general sales manager Plymouth Motor Corporation, Detroit, Mich.

Luncheon

2.30 P. M.—"Make Service Produce Larger Profits," William G. Dow, service manager Studebaker Sales Company, Elizabeth, N. J.

3.00 P. M.—"The Dealer's Prospects," Joseph P. Little, General Motors Corporation, Detroit.

3.30 P. M.—"Selling for Profit," W. M. Packer, Eastern regional manager Chevrolet Motor Company, Buffalo, N. Y.

4.00 P. M.—"Each Cloud Has a Silver Lining," William B. Burruss, National Automobile Dealers' Association.

5.30 P. M.—Ocean bathing.

7.30 P. M.—Banquet.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

SPARKS *from* DETROIT

Studebaker to Scale New Peaks

* * *

Yesterday Hill Climbs

* * *

Pete De Paolo Gets a Call

Chris Sinsabaugh—Detroit Editor

JUST like Alexander, Studebaker always is seeking new worlds to conquer. First it was stock car speedway records, and we all know what the campaign in that direction produced—all long distance marks wiped off the slate at Atlantic City, sensational performances which followed the general belief "it can't be done."

This year the Erskine forces are taking to the hills, and the last reports we have lead us to believe that before the end of the year the record crop will have been harvested. As the plan is, the free-wheeling Studebaker stock car, driven by Ab Jenkins, and under the watchful eye of the A. A. A., has set out to smash the record on every grade that in the past has been a classic hill-climb. Giant's Despair at Wilkes-Barre, Pikes Peak, the "climb to the clouds" up Mount Washington, New England's towering peak; that awful Summit Mountain at Uniontown, Pa., and others just as historic are included in this category. So far there hasn't been a hitch, the most sensational performance being the Uniontown conquest, with Jenkins sending the Studebaker to the top of the three-mile grade in 3 minutes 16 seconds, clipping 11 2-5 seconds off the record.

* * *

IN the past, hill-climbing performance counted a lot in the minds of the owners. It still does, but in those earlier days there wasn't so much high-gear work, nor were the roads what they are today. Twenty years back motor car manufacturers regarded a hill-climb victory as something worth hollering about, and because of this many contests were staged in all parts of the country.

Take the Algonquin hill climb, for instance. That was Chicago's pride and it became one of the most famous in the country. Chicago was hard put to find anything in the vicinity that could be called a hill, so it was necessary to go fifty miles into the country to discover anything to climb. At Algonquin the Chicago Automobile Dealers' Association, which sponsored the affair, found two "hills." One was a short quarter mile of about 15 per cent. grade and the other was a half mile up a 12 per cent. incline, one at each side of the town. To make a contest out of it, Dave Beecroft and his technical colleagues evolved a wonderful formula in which weight, etc., figured, and performances on both hills counted.

Even with such dull tools, Algonquin became a classic. Here it was we first heard of Fred Duesenberg, who came along with a two-cylinder Mason to win his class. Famous race drivers of those days competed and nearly every car manufactured was represented. The crowning feature was the free-for-all in which the formula was not used, but which was decided by the total time on both hills.

Frank Kulick caused the abandonment of Algonquin. Frank came along with a specially built Ford, carrying a six-cylinder engine, a light contraption that skinned up the two hills so fast in the free-for-all that every one took the Kulick dust. The next year, when the promoters started after entries the recollection of the Kulick victory was too much for dealers selling higher priced cars and the classic became a memory.

* * *

FIRST of all, I take it for granted that you know that Pete De Paolo is a former A. A. A. race champion and one of the winners of the 500-mile race at Indianapolis. Now he is through racing and on the De Soto pay roll—sales promotion and stuff of that sort, you know. It is necessary to build up this background to appreciate the story that's going around about Uncle Ralph De Palma's nephew.

Pete undertook to drive Eddie Bachelor out to Tam O'Shanter the other Sunday at a time when traffic was particularly heavy. Pete wormed his way through, but at one point he aroused the ire of another driver, who yelled at him: "Where did you learn to drive, feller?"

"At Indianapolis," the ex-champion answered with a grin.

"I knew you were one of those hick-town drivers," retorted the Detroiter, a bit unconscious of the humor of his comeback because he did not know who Pete was.

This Firm Uses Service Salesmen Plan Successfully

Berry Motor Car Co., Packard Dealer in St. Louis, Devotes Considerable Effort to Bring New Car Owners Into Its Service Dept.

THE Berry Motor Car Company, 2201 Locust Boulevard, St. Louis, Mo., Packard dealer, believes in having its new car owners getting acquainted with the service department as soon as possible.

J. N. Gaither, sales manager of the service department, with this in view, has created a service sales plan which has brought unparalleled success.

When a new automobile is sold a letter is sent by Mr. Berry, president of the company, to the new owner, thanking him for his order. About five days later Mr. Gaither sends a letter to the new owner, telling him which service salesman is to take care of his automobile when he brings it into the service department. A lubrication and adjustment schedule, based for 1,000-mile intervals, is inclosed, and also a card introducing the new owner to the battery distributer, so he may have battery distributor, so he may have

The owner is invited to bring his car in every 2,000 miles for a free inspection, at which time a written report and estimate is given, with all work classified under two headings: (1) necessary work and (2) suggestive work.

A close follow-up is maintained of all car owners, and records are kept as to when thirty, sixty or ninety days have passed without their calling at the garage for service work.

Should ninety days pass and the car owner has not called, the service salesman telephones to find out why he has not been in, and notations of all telephone calls are placed on the office files. Should the car owner have any complaint, a complaint blank is filled out, and every effort is made to adjust same to his personal satisfaction.

A recent check-up by Mr. Gaither showed that fully 70 per cent. of the car owners on file in his office had brought their automobiles in for service work within at least ninety days.

Mr. Gaither also uses a few seasonal letters for advertising, and during the winter months offers some special prices for major operations. All work is done on a flat rate basis, both for time and materials.

The car owners served by the department are divided into three groups, and a service salesman is in charge of each group. Each man handles approximately 550 owners. The car owner is served by the same service salesman every time he calls at the garage. By handling the customers in this manner it gives both owner and service salesman an opportunity to attain a personal touch.

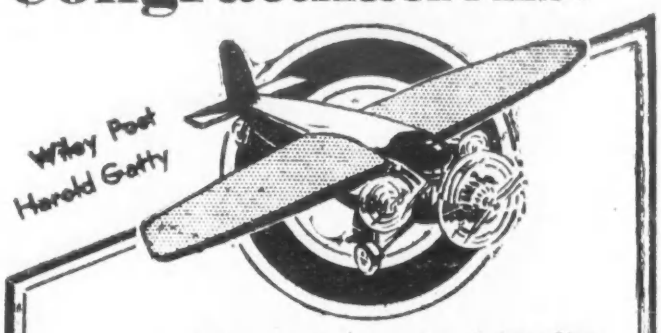
The service salesman is held entirely responsible for the customer's satisfaction. Should the service salesman handling a certain owner be out when he calls, the order is taken by another salesman on the floor and is turned over to the owner's regular salesman when he returns.

A comprehensive chart is kept in the service manager's office which gives an accumulated daily report of the service salesmen's activities, such as orders written, complaints, customers called on telephone, inspections, production in jobs and amount, policy and warranty jobs and corrective labor.

This record is transferred daily to Mr. Gaither's files and at the end of the month he has a comprehensive report of his service salesmen's activities in the number of jobs, amounts, complaints, etc. Besides a detailed report of his service salesmen at the end of each month, Mr. Gaither also keeps a record of the time and work done by his mechanics and the fitting and delivery department for new cars. He knows what his department is doing and they are hustling for him daily with very excellent results.

Timely 'Ad' Tie-up

Congratulations!



. . . to the intrepid airmen whose daring achievement will long be remembered by the people of the earth . . . Congratulations to their families who were willing to sacrifice their son, father or husband in order that aviation might progress . . . Congratulations to the "Winnie Mae"—that sturdy monoplane that played its part so nobly in this daring epoch of the air.

And Now . . .

1928	Graham-Paige	$300
1925	Hudson Sedan	$50
1926	Reo Sedan	$100
1927	Stutz Sedan	$400
1928	Franklin Sedan	$150
1930	Auburn Cab. (8)	$775
1930	Auburn Sedan (8)	$775
1929	Chrysler Roadster	$475
1928	Nash Coach	$400
1928	Essex Coach	$150

TAIT MOTOR SALES, Inc.
611 Main St. Tel. 3-5129
"Open Evenings"

NO SOONER had Wiley Post and Harold Gatty completed their round-the-world flight than the Tait Motor Sales, Inc., Springfield, Mass., in its used car advertisement, flashed its congratulations as shown above. Ten used car specials were listed in the ad

HUPMOBILE ADDED A DEALER A DAY DURING JUNE

Detroit, Mich., July 9.—A dealer a day was added to Hupmobile's retail representatives, factory contracts revealed here today.

Fourteen states, Canada and Alaska gained new Hupmobile dealers last month. Hupp's new representative in Juneau indicates the world-wide popularity of Hupmobile cars. The new dealers added include:—

W. E. Walthall Company of Sanford, Fla.; L. S. Schonbelen of La Porte City, and Ingerson Motor Company of Wyoming, Ia.; Cataldo's Garage of Chelsea, Mass.; Leitch Sales Company of Muskegon, Mich.; M. W. Fox of Kenyon, Meek Garage of Pine Island, and Steve's Repair Shop of Willmar, Minn.; C. F. Pfeiffer Motors, Inc., of Camden, M. H. Motor Company of New Egypt, and Allied Motors, Inc., of Red Bank, N. J.; Peter Gabrione, Inc., of Bronx, City Motors Corporation of Coney Island, Donald C. Eaton of Middletown, M. J. Kluger, Inc., of Ozone Park, and Ralph P. Hamilton of Wellsville, N. Y.; Newton Motor Company of Newton, N. C.; the Fore Motor Company of Seminole, and the Fore Motor Company of Wewoka, Okla.; N. E. Johnson of Marshfield, Ore.; R. S. Dixson of Muncy, J. S. Daubert of Norristown, Fred D. Heilman of Reading, and Sharosky Motor Company of Steelton, Pa.; Bell Motor Company of Gainesville, Tex.; A. E. Blair of Port Angeles, Wash.; Liskeard Motors of New Liskeard, Ontario; Clarence L. Robins of Niagara Falls, Ontario; Carlson Taxi Service of Juneau, Alaska.

DE HART & SON NAMED PIERCE-ARROW DEALER

Camden, N. J., July 9.—Replacing Johnston, Inc., H. A. De Hart & Son have been appointed local dealer for Pierce-Arrow with authority to operate throughout Camden, Burlington and Gloucester counties.

As heretofore the showroom of the new dealer will be at Crescent Boulevard and Haddon Avenue, for the past few years south Jersey headquarters for Brockway trucks, which line is still retained.

In addition to having the largest showroom in south Jersey for the display of trucks and Pierce-Arrow cars, De Hart & Son operate a complete body building plant at Thorofare. E. Frutche, Jr., formerly with Johnston, Inc., continues with the new firm as manager.

GRAHAM SALES GAIN 65.2% IN COOK COUNTY

Chicago, July 9.—Further evidence of the stimulus to Graham sales caused by the recent introduction of the Prosperity Six is contained in an announcement by George H. Bird, president of Bird-Sykes Company, distributors for the Chicago territory, to the effect that Cook county registrations for June showed a 65.2 per cent. gain for Graham automobiles over May.

Ford Dealer Convinces on Resale Value as a Basis For His Service Talk

CONVINCING the customer that if he keeps his car in good condition it will bring a better allowance when he trades it in, has been a cardinal policy of the service department at Tuthill Motors of Stamford, Inc., Ford dealership, with showrooms at 880 Main St., Stamford, Conn. As a result of this policy, which is followed out by every member of the service staff, the dealership has succeeded in expanding its service volume materially.

The department now employs seventeen men and handles an average of sixty-five cars per day, according to M. J. Currivan, service manager. A good share of this business, he believes, is traceable to the constant hammering on the theme of preserving the trade-in value. Brought to realize the truth of this statement, the customer is more willing to spend for maintenance work, as a general rule.

The entire service staff is trained to talk to customers along this line, and, in Mr. Currivan's opinion, it is a completely successful proposition. The manager and his assistant "work on" the customer along this line, and the rest of the force use the argument whenever an occasion presents itself.

Referring to "specials," which the department has employed successfully for some time, Mr. Currivan said that, in his opinion, it is up to the man who first receives the car to sell them. A placard prominently situated near the front door is used for advertising of these offers, but word-of-mouth "plugging" has proven the most effective.

One such offer made recently, for instance, was complete lubrication and spraying of springs for $1.

"Everybody must be satisfied," Mr. Currivan declared. "Following this policy strictly may chop a little off the profit now and then, but in the long run it pays heavily. We will stand back of our guarantee regardless of the cost, and our customers know this."

CZECH CAR MAKERS FORM CONSOLIDATION

Washington, July 9.—Merger of three large Czecho-Slovak automobile concerns, the Skoda Works, the Ceskomoravska Kolben Danek and the Tatra Works, in an organization similar to that of General Motors in this country, was reported to the Department of Commerce today in a cable from Acting Commercial Attache Sam E. Woods at Prague.

L. L. STAGE SALES MANAGER OF LAFAYETTE MOTORS, INC.

Indianapolis, Ind., July 9.—Lawrence A. Stage, who had been sales manager of the Lincoln division of the Ford Motor Company branch here for the last year and a half, has left that post to assume managership of Lafayette Motors, Inc., Lafayette, Ind., Ford and Lincoln dealer. Mr. Stage has been identified with the automobile trade in Indianapolis for more than ten years, having begun his service as a retail salesman.

OAKLAND OPENS FACTORY PARTS DEPOT IN ATLANTA

Atlanta, Ga., July 9.—The Oakland Motor Car Company has opened a new factory-operated parts depot at 435 Spring St., N. W., which will serve the states of Florida, Alabama, Georgia, North Carolina, South Carolina, Tennesee and Mississippi.

The new warehouse is a modern two-story brick and concrete structure with a monitor type roof. It provides 15,000 square feet of floor space and is unusually efficient from a lighting and ventilation standpoint.

A stock of parts, valued at approximately $60,000, is on hand at all times. So complete is the stock, officials point out, that, if necessary, new cars could be assembled from the parts kept in the building. L. C. Cook has been appointed manager.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

Boosting July Service

Clip the COUPONS

In This Ad---They Are Valuable!

Starting today and continuing every day during July we will offer special bargains to owners of Chevrolet cars. Watch this ad every week!

USE THESE COUPONS---THEY'RE WORTH MORE THAN THEIR WEIGHT IN GOLD!

It will pay you well to take advantage of the special bargains we offer this month—and all work is guaranteed.

HERE ARE THE FIRST FOUR COUPONS—CLIP THEM—SAVE MONEY

This Coupon Good For $2.75	This Coupon Good For $2.00	This Coupon Good For $3.25	This Coupon Good For $2.75
—On the Cleaning of Carbon, Grinding and Refacing Valves, Re-setting Head and Tuning Motor of a 6-cylinder Chevrolet.	—On the Cleaning of Carbon, Grinding and Refacing Valves, Re-setting Head and Tuning Motor of a 6-cylinder Chevrolet.	—On the Replacing of a Fly Wheel in any Chevrolet	—On the Overhauling of a Clutch in any Chevrolet.
This Offer Expires July 10, 1931.	This Offer Expires July 10, 1931.	This Offer Expires July 10, 1931.	This Offer Expires July 10, 1931.

MORE BARGAINS COMING NEXT WEEK! WATCH THIS AD!

Park Your Car Out Of the Sun Drive In

EARL WEAVER
CHEVROLET
41-45 Main St. Oil City, Pa. Phone 1382

Only 3 Minutes Walk From the Center Of Town

AS AN AID to stimulating business volume in its service shop during July, the firm of Earl Weaver, Chevrolet dealer of Oil City, Pa., has resorted to advertising in the local newspapers. The plan provides for insertion in the local papers of a four-column advertisement. Each advertisement contains four coupons, which when presented at the service station are accepted as part payment for such work as valve grinding, carbon cleaning, replacement of fly wheel, overhauling of clutch, etc.

Automotive Daily News

"Of, By and For the Entire Automotive Industry"

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FRIDAY, JULY 10, 1931

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There Are Others

SOMEHOW it is heartening to the ordinary human being to realize that other people have troubles, too. The Bureau of Business Research of Harvard University recently released a survey of department store business in 1930, showing that this class of retail activity not only did not earn a profit during that year but actually conducted a philanthropic enterprise.

The survey shows that, while there were instances of department stores which made a satisfactory profit on the year's operations, the vast majority showed a loss, when interest on the investment was considered.

One of the most important factors in creating this situation was the service which department stores are called upon to give. The problem of returned goods alone is enough to give department store officials mops of gray hair. In some cases 40 per cent. of the purchases made are later returned for credit or exchange. Deliveries, which must be made promptly and to cover a wide territory, cost department stores huge sums.

If the automobile industry has to struggle with its used car problem, other businesses have equally damaging conditions to face. The truth is that, while our production machinery has reached a high state of efficiency, our distribution system is archaic. The next great step forward that American business has got to make is to bring its distribution up to a state of efficiency comparable with production.

And there, my lords and gentlemen, is a problem to test the best brains that this or any other country can find.

Uneven Imposts

IT is somewhat amusing to note how widely the various states of our Union differ in the charges that they make for the privilege of owning and operating a motor vehicle. W. C. Markham, executive secretary of the American Association of Highway Officials, has recently finished a compilation that gives some interesting glimpses of the uneven imposts imposed by the various states.

In Oregon, Mr. Markham's figures show that the average annual cost for license fees, gasoline and other taxes runs to $62.74, while in Massachusetts the average is but $20.89. We wonder whether that includes the compulsory insurance that Massachusetts has been experimenting with, not altogether happily.

In Michigan the cost of the imponderables runs to $33.27 per annum, while New York mortosists get away with $30.04. The average gasoline tax, by the way, now stands at 3.35 cents per gallon, with the state legislators licking their lips in anticipation of further mulctings.

It all seems rather a stiff price to charge, just for the privilege of owning and operating a motor vehicle. We wonder why they do not try taxing ownership of telephones or radios, or charge for the privilege of reading newspapers or drawing checks or what not.

Employment in the tire industry is reported definitely on the upgrade. If prices start in the same direction, the tire manufacturers' cup of delight will probably be filled to the brim.

Jules Verne has probably made a complete turnover in his grave since Post and Gatty cut his famous eighty-day trip of the world to eight. Incidentally, if Jules Verne had had the benefit of the internal combustion engine, he would have done some cutting himself.

NEW BILL OF SALE LAW GIVES DEALER LONE AUTHORITY

Trenton, N. J., July 9.—Under a new motor vehicle law which became effective July 1, justices of the peace, attorneys, notaries and other officers who formerly drew up bills of sale lost that authority.

The new law provides that bills of sale must be drawn by authorized new car dealers. The forms are being provided by the state department of motor vehicles. The law is aimed to put a stop to the sale of stolen automobiles in the state. The state commissioner of motor vehicles and his agents are charged with the strict enforcement of the law.

The penalties provided are severe, as a person may be fined for violating its provisions or serve two years in prison or both and the cancellation of title papers.

When individuals sell cars both the buyer and seller must go to the motor vehicle agency. The new act provides a bill of sale law division. The regular fees for drawing a bill of sale will be charged and fifty cents for filing. That fee is calculated to pay the costs of maintaining the law division.

Papers issued by new car dealers to purchasers of automobiles must be filed with motor vehicle department within five days, otherwise an application must be made to the state commissioner at Trenton for permission for filing.

Where a motor vehicle is in the possession of a garage keeper, dealer or service station a paper signed by the person delivering the car must be presented to the motor vehicle agency. This must be accompanied by the title papers.

Duplicate bills of sale must be filed whether the car is registered or not. Original bills of sale can be issued by authorized dealers for the make of car for which he is the dealer and no other make.

UNITED CHROMIUM FILES SUITS AGAINST CHRYSLER

Wilmington, July 9.—Patent infringement suit has been filed in United States District Court here by United Chromium, Inc., of New York, against Chrysler Corporation, alleging infringement of two patents covering chromium plating methods. The two patents involved were issued to Colin G. Fink, one on April 20, 1926, for a process of electro-depositing chromium and preparation of baths and the other issued on April 28, 1931, for a process of producing chromium plated articles. Mr. Fink assigned the patents to the Chemical Treatment Company, Inc., and the latter assigned them to the Chromium Corporation of America, which corporation later assigned them to United Chromium, Inc.

COMING EVENTS

JULY

19—**Nurburg-Ring, Rhineland, Germany.** Automobile Club of Germany, grand prize race

SEPTEMBER

1- 3—**Cleveland, O.** Hotel Statler, Society of Automotive Engineers, twentieth annual aeronautical meeting in conjunction with National Air races.
8-17—**Utrecht, Holland.** Utrecht Fair, bus and truck show.
16-17—**Atlantic City, N. J.** National Petroleum Association, annual meeting, Hotel Traymore.
20-26—**Springfield, Mass.** Eastern States Exposition.
21-25—**Boston, Mass.** American Welding Society, meeting.
28-29—**Atlantic City, N. J.** National Association of Motor Bus Operators, fifth annual meeting, Hotel Ambassador.
26-Oct. 2—**Atlantic City, N. J.** American Electric Railway Association, annual meeting.

OCTOBER

1-11—**Paris, France.** International Automobile Salon.
2- 3—**Houston, Tex.** American Institute of Mining and Metallurgical Engineers, petroleum division meeting.
12-16—**Chicago, Ill.** National Safety Council.
14-16—**Pittsburgh, Pa.** Society of Industrial Engineers, convention.
15-24—**London, England.** International Motor Exhibition, Olympia Hall.
22-28—**Prague, Czecho-Slovakia.** International Automobile Exposition.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

Contemporary Comment

OF RECENT years Chekiang Province (on the coast south of Shanghai) has been one of the progressive sections of China in the matter of highway development. A well-organized highway bureau, which has been functioning for several years, has made great strides in the co-ordination of existing highways and the stimulation of new construction.

According to the director of the Chekiang highway administration, at Hangchow, there was on July 1, 1930, a total of 526 miles of highways opened to traffic. On most of this mileage, public bus transportation facilities are being operated, either by the government or by commercial companies.

The most important road so far completed is the Chekiang portion of the Hangchow-Nanking Highway. This road, a part of the national trunk lines, runs in the province from Hangchow to the Kiangsu border, a distance of 82 miles, passing through the wealthy silk and mining districts of Wukang, Huchow and Changhing.

Traffic over this Chekiang section has been possible for more than a year; now that surfacing the portion in Kiangsu province (to the north) is to be completed this autumn, the importance of this road will take on full significance. It will make possible a ten-hour motor trip between Hangchow, the provincial capital of Chekiang, and Nanking, the national capital, where now it is an overnight journey by rail.

The recent turnover in the political administration of Chekiang province has brought about a conservative retrenchment policy that has held up some reconstruction plans announced during 1930. Despite reduced income resulting from abolition of likin taxes, the administration has announced the 1931 highway program which includes: (*a*) Completion of the Shanghai-Hangchow road, about 87 miles of which lies in Chekiang province; (*b*) the Ningpo-Chenhai road, connecting the Ningpo railway station and Kwan-Hai-Wei with a branch to Chenhai, is to be completed this year; (*c*) the Hwangyen-Yotsing road with a branch to Haimen, a seaport on Taichow Bay, now under construction, will be completed this year, thus greatly facilitating communication between inland points and the sea; (*d*) around Hangchow the administration is surface-treating many of the roads and streets and endeavoring to complete the road to Nanking prior to the Fourth Biennial Conference of the Institute of Pacific Relations, which is to meet at Hangchow during October of this year.—***A. Viola Smith in Commerce Reports.***

* * *

KEEN traffic observers note that many collisions are brought about because the operator of one or the other of the cars involved is watching a too restricted space; that is, he is not aware of what is going on except within too narrow limits. He does not look far enough up the road to see the impending emergencies.

Another feature of driving is brought forward by an observer, who was a personnel agent in the war and had charge of the selection of officers. His experience seemed to indicate that every person reacts to fear or a bad scare in one of two ways. There is the type who does not lose his head but keeps on thinking, even though he is frightened, and directs his course along what appears to his reasoning mind to be the best way.

The other type is the man whose mind becomes more or less paralyzed by the scare and who does not do anything except continue along whatever course he has embarked upon. There are instances where people shut their eyes when danger impends. This characteristic, taken with that of the sight line when driving the car, is undoubtedly worth considering as a possible future item of education. Certainly, if he can be detected, a man of the second type, who loses his head and whose reason departs as soon as danger protends, is not a man to whom to intrust the driving of a car.

In considering these two characteristics of operation one can readily see how a serious accident might result from their combination. The man who is not watching for the situations which are already in sight or which may arise because he does not use his imaginative ability to see how the course of others may affect his own, may find himself suddenly in a situation where he becomes badly frightened. If he is the type who cannot find his way out, whose brain is not automatic in execution and selection of the best course, he will cause or participate in a bad accident.

One ought to look ahead of a car and be aware of everything that is in sight. At night time, of course, the vision is limited, but even then to be aware of everything which is going on within the limits of vision is necessary, for if everything which is happening or every single happening is not observed, then the very one which may contribute to an accident is apt to be overlooked with consequent disastrous results.—**Robbins B. Stoeckel, Commissioner of Motor Vehicles, State of Connecticut, in United States Daily.**

Are Dash Instruments A Danger Factor?

A British Writer Argues That They Would Be Better Grouped in Some Other Location

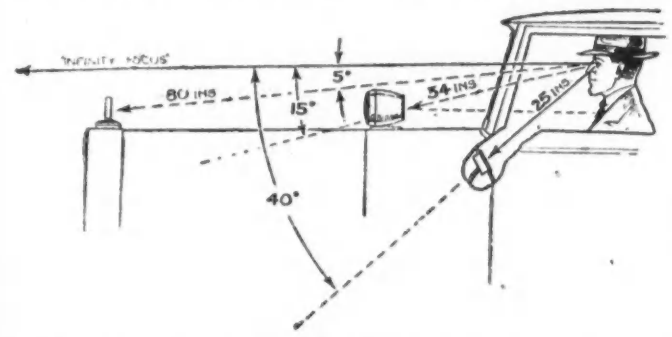
By MONTAGUE TOMBS
In the Autocar (English)

GRADUALLY there is dawning among motorists who are regular users of the main roads a conviction that something is wrong with the existing method of mounting the dials of the instruments necessary on the car. So far this opinion has been more or less inarticulate, because the defect has been slow in building up to the point where it is becoming tiresome, if not actually dangerous.

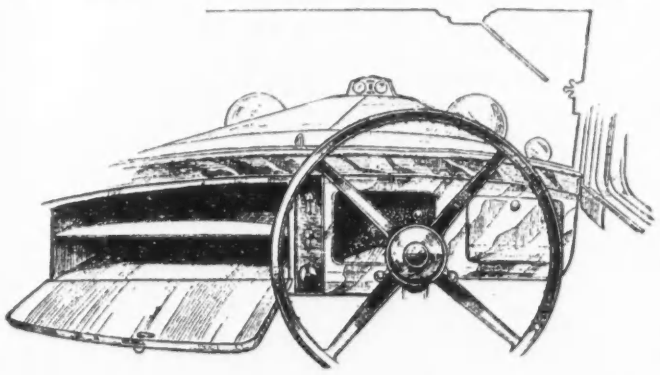
Traditionally the instrument dials have been mounted on the dash. Antique open cars with no dosh carried a few instruments in the full light of day, speeds were low, and traffic was a mere trickle of vehicles. Today cars average high speeds from place to place, and traffic congestion is one of the problems of the world. Yet fashion is tucking fancifully shaped dials in gay groups underneath the rim of the dash. These dials are difficult to see, and the driver of the modern fast car has to perform optical gymnastics which compel him to deflect his eyesight from the road for valuable seconds.

How long does it take for the driver to switch his vision from the road in front down to the speedometer dial, read the speed and once again look up and get the road back into focus? I asked myself this question, and then made some simple experiments with a stop-watch, invoking the aid of several friends among the old hands at competition and roce driving.

It was desired to obtain reliable results, and the method adopted in each case was as follows: The car was made to travel at a steady speed about thirty yards behind any chance car which was about to be overtaken. When I gave the word my driver had to look at the number on the car in front, and announce any single numeral from it, then, as quickly as he was able, look down, announce the figure shown on the speedometer dial, look up again and announce another numeral from the number plate in front. His speech then was something like this: "Seven—forty-two—three." By causing him to speak aloud what he read, I was able to make certain that he actually did focus the various objects correctly, for the focusing is one of the important points. A glance may flicker very quickly from one point to another, but to understand as well as see takes time.



SHOWING HOW THE DRIVER has to deflect his sight from a normal line through an angle of 40 degrees in order to read the speedometer



SUGGESTED MOUNTING of the instruments in a group on top of the radiator, leaving the whole of the dash free for shelves and cupboards

Well, the time taken by various drivers on various cars lay between one and a half and three and a half seconds, and the average was about two seconds. This is indeed a long time, for much can happen in two seconds when cars are hurrying along a traffic-laden main road!

Consider the following facts: A speed of 60 m. p. h. is equal approximately to eighty-eight feet per second, so 40 m. p. h. is about fifty-eight feet per second. In those two seconds which elapsed while that driver just glanced at his speedometer the car traveled about 116 feet, or at least one and a half times the distance in which a fairly good set of four-wheel brakes could pull the car up from 40 m. p. h. The time taken for the speedometer reading and eye focusing is constant, hence a car traveling at m. 60 p. h. would cover 176 feet in two seconds.

Why does it take so long for a driver to look at a speedometer and back again to the road? The answer inevitably is that the speedometer—together with the other instruments—is placed in absolutely the wrong position. With the dial tucked away on a sunk and fancy instrument panel, submerged below the dash, and usually in a darkened place, the driver has to alter the focus of his eyesight from seventy-five yards or so ahead, according to his habit and his speed, down to a focus of eighteen or twenty-four inches, his pupils have to accommodate a change in illumination, and he has to deflect the line of his sight through an angle of about 40 degrees. These points are made plain in the accompanying diagram.

The solid lines show the angles of vision, while the dottted lines indicate how benefit would be obtained by alterations in instrument mounting.

At this point a digression has its interest. There can be no doubt that the finest equipment which a motorist can have is alert sight. Quickness of sight is much more important than the ability to read a stationary number plate at a range of twenty-five yards, which is the sight qualification necessary to secure a driving license under the present laws. Recently it has been pointed out by a medical deputation to the minister of transport that the reaction time of an average individual—which is the time which elapses while an image accepted by the eye is being translated by the brain into some necessary muscular movement of the limbs—is about one-fifth of a second, and that only one little alcoholic drink can slow this time down to four-fifths of a second without the individual being at all conscious of the fact. In all cases of motoring emergency, therefore, we have to contend with a reaction time delay. But it is necessary to go beyond that point and to take into account the speed of sight adjustment as well. The eye must have time to distinguish what is happening before it is in a condition to start sending its message to the brain, or before the brain can make sense out of what the eye is seeing, whichever process is the actuality.

The Importance of Outlook

In view of these facts it becomes obvious that an absolute premium is placed upon the ability of the driver to see, and to see easily and quickly, everything that concerns him. A driver's outlook from the car is of supreme importance. The windshield must be free from causing distortion, when wet as well as dry, the screen wiper must work properly, the screen should be as close to the driver's head as possible so as to give the widest field of view without pillar obstruction, and so on. These are points which are fairly well looked after in modern design. But we continue to build cars that are utterly out of date as regards the position of the instruments.

No ordinary motorist glues his gaze on the road and takes rapid, nervous glances at the speedometer. I do not suggest that. But the driver who is slipping nimbly along a broad road in the midst of a stream of traffic, or burning an open road, has to maintain an alert gaze, and he also needs to keep the time, his speed, the oil pressure and such like things constantly in mind. The more easily, the more unconsciously, he can be made aware of these matters the less is

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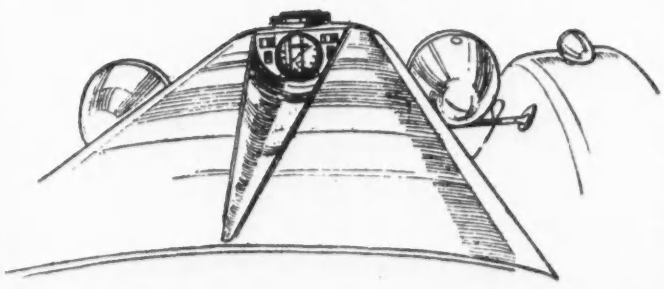
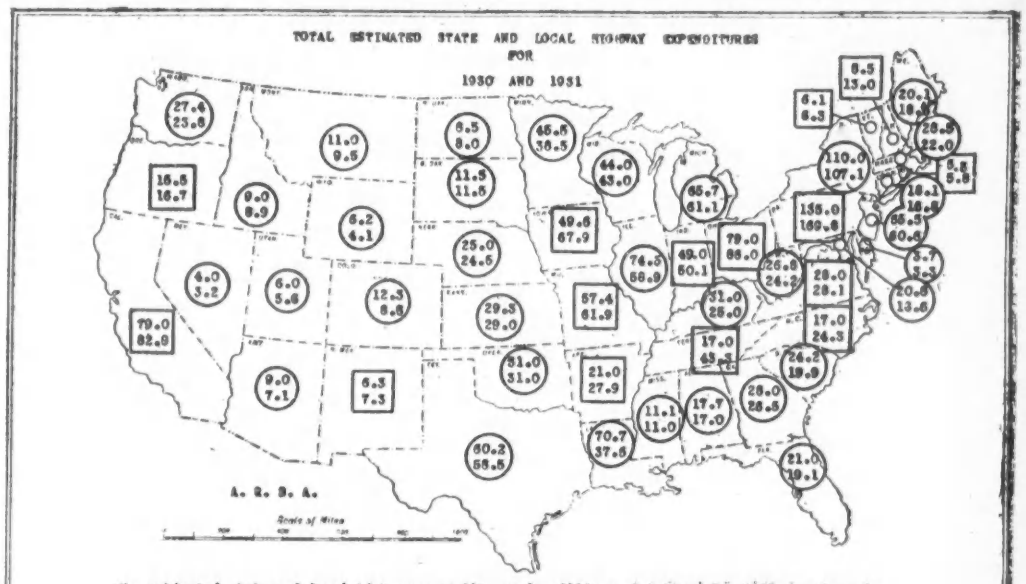


GEORGE LANCHESTER'S suggestion for mounting the instruments in a channel scooped out of the top of the bonnet



The estimated state and local highway expenditures in millions of dollars for 1931 are shown in top figures, compared with the 1930 estimates shown in lower. Circles, 33 states, indicate that the 1931 estimates exceed or equal the 1930 figures; squares indicate a decrease. The estimates include construction and maintenance expenditures.

TOTAL ESTIMATED STATE AND LOCAL HIGHWAY EXPENDITURES FOR 1931 $ 1,550,881,000
FOR 1930 1,562,945,000

Road Builders' President Urges Increased Highway Appropriations

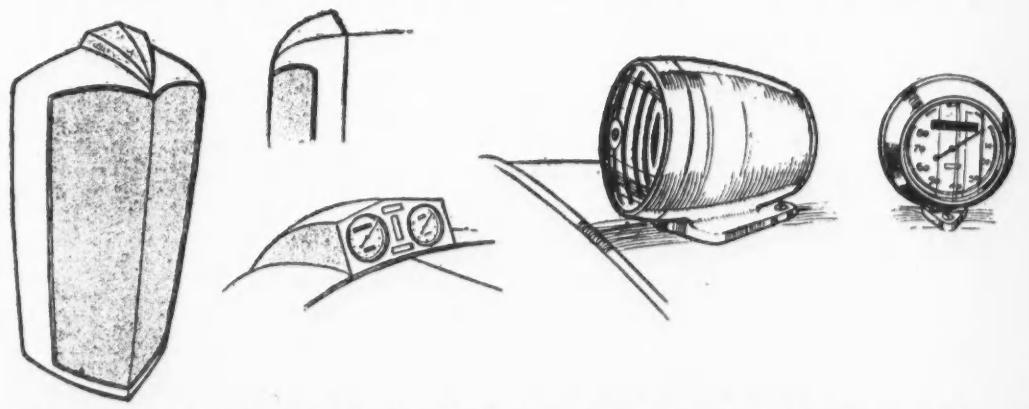
WASHINGTON, July 9.—Traffic demands are increasing each year, due to the increased speeds of motor vehicles. Roads constructed for safety at low speeds must be reconstructed for safety at higher speeds, declares W. R. Smith, president of the American Road Builders' Association.

"Safety with reasonable speeds is what every one wants on the roads. But just as a fast railroad train cannot make sixty miles an hour over light rails with safety and comfort, so a motor vehicle cannot make high speed with safety and comfort over an inadequate highway," Mr. Smith continued.

The accompanying chart shows the status of 1930 and 1931, and "the need for increased appropriations is at once evident," asserts Mr. Smith. "The decrease of $50,000,000 in county appropriations accounts for the lack of increase in the total figures in the 1931 estimate. The total for state highways, including Federal aid, is estimated at $50,000,000 more in 1931 than in the previous year.

"Bond issues for road improvements permit the construction of a large mileage of modern roads immediately and serve to reduce congestion and provide safe roads. The general increase in prosperity and the profits from reduced depreciation on motor vehicles and reduced operating costs are far in excess of the bond interest charges. The cost of the improvement is spread over a number of years and is usually met by the motor vehicle owners.

"Economy in roads and streets is brought about by reducing losses. This is not merely a matter of reduced expenditures. On the contrary, reducing expenditures on roads means increasing the losses under the present conditions of lack of safety and the costly congestion of highways," he concluded.



LEFT—Suggested design for a radiator shell with instruments mounted within a fairing on the top. The radiator cap is to be inside the bonnet. Right—A streamline casing, containing horn and speedometer, mounted on scuttle. The dial of the speedometer faces the driver

Production - - Engineering - - Factory -

Properties of Malleable Iron Castings

The following is part of the first symposium on malleable iron castings planned by the American Foundrymen's Association and the American Society for Testing Materials. It was prepared by a committee of the two societies for the purpose of providing the engineering profession with authoritative data in concise form on the properties of metal castings produced by the best present methods.

The Brinell hardness of malleable iron is usually about 115 and values

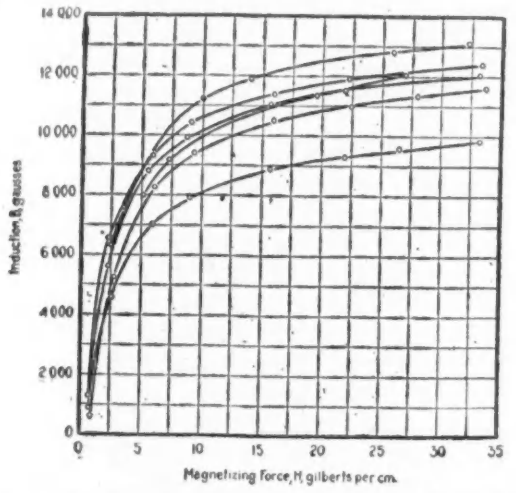


FIG. 3. Magnetization curves for various malleable irons

may range from about 100 to about 140, as shown in the following tabulation of tests from four investigators:

Brinell Hardness of Malleable Iron

	Max.	Min.	Ave.	No. of Tests
No. 1.....	143	105	115	25
No. 2.....	130	100	110	25
No. 3.....	143	131	137	10
No. 4.....	130	110	120	5

The Brinell hardness is in large measure a function of the free carbon content. There exists a general relation that metal of high tensile strength is usually higher in Brinell hardness and vice versa. The correlation is, however, not sufficiently close to use Brinell tests in substitution for tension tests. An increase in tensile strength of 10,000 pounds per square inch is accompanied by an increase in hardness of only about 15, while the maxima and minima of hardness values for a given strength often depart by this much from the average.

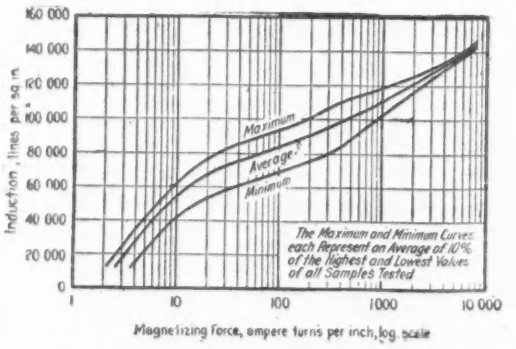


FIG. 4. Magnetization curves for malleable iron

Nor is Brinell hardness a useful indication of machineability unless the observed hardness falls very far above the range of values given above. The Brinell test will detect an unannealed or enormously underannealed product, but will not differentiate between two materials of nearly similar and normal machineability. Nor will it detect pearlitic rims of sufficient magnitude to greatly affect machineability.

Impact Strength

Charpy impact values for malleable iron are seldom determined. Only two investigators have reported values, as follows:

Charpy Impact Values of Malleable Iron (Ft.-Lb.)

	Max.	Min.	Ave.	No. of Tests
No. 1.....	..	..	7.5	100
No. 2.....	10	7	8	...

An average value of 7.75 is the best that can be reported.

One investigator reports Izod impact values on malleable iron, before galvanizing and after galvanizing, as follows:

Izod Impact Values of Malleable Iron (Ft.-Lb.)

	Max.	Min.	Ave.	No. of Tests
Before galvanizing	12.9	7.9	9.3	360
After galvanizing	11.0	7.8	8.5	360

The so-called "wedge test" is frequently made on malleable iron as a general indication of the ability of the product to withstand impact. Following is a brief description of this test:

A wedge of the material 6 inches long by 1 inch wide, tapering in thickness from ½ inch at the butt to ⅛ inch at the tip or thin end, is subjected to successive blows of a 21-pound tup falling from a height of 3 1-3 feet, representing energy of 70 foot-pound. The thin end is first bent over for a length of about ½ inch by means of a hand hammer, starting a "curl." Then the wedge is firmly secured, in approximately a vertical position, at the butt end in a clamp which forms part of an anvil. The tup strikes the curl at the thin end of the wedge, and the clamp is so fitted that the wedge can be gradually tilted from a vertical position in order that the tup may always strike the highest point of the curl. The number of blows required to produce the first sign of fracture is recorded. Obviously the enery of each succeeding blow increases slightly, as the distance through which the tup falls increases by the amount of deformation of the wedge. While the test is distinctly an arbitrary one, it has the merit of being easily and cheaply made, and it seems to be a fairly reliable measure of the shock-resisting qualities of the metal, giving results consistent with the observations of practical experience. It is customary to end the test at thirty blows if no fracture has developed by that time.

Fatigue Endurance Limit—Only one careful determination of fatigue endurance limit of malleable iron is known. This was made on iron of slightly above the minimum properties of A. S. T. M. Specifications A 47-30, using the rotating-beam (Farmer type) machine-producing alternate tension and compression in flexure—on a specimen 0.40 in. in diam., the radius at the point of failure (min. diam.) being about 3 in. An endurance limit between 25,000 and 26,000 lb. per sq. in. was indicated, thus agreeing with the frequently observed ratio of endurance limit to tensile strength of wrought ferrous metals of approximately 0.5.

Effect of Temperature on Properties—If malleable iron is heated above the lower critical point, about 760 deg. C. (1,400 deg. F.), carbon redissolves and the character of the material changes. Hence the use of malleable iron at temperatures over about 1,200 to 1,300 deg. F. should be avoided.

Malleable iron retains its normal "room temperature" tensile strength at temperatures up to about 800 deg. F.; above that temperature the strength decreases rapidly, being at 1,200 deg. F. only one-fourth to one-fifth the tensile strength at room temperature. The elongation is also practically constant up to 800 or 900 deg. F., and rises sharply above the latter temperature.

A few tests on impact strength of malleable iron at temperatures from about —75 deg. to +390 deg. F. have been reported by Schwartz. These tests show impact resistance to be apparently unaffected by

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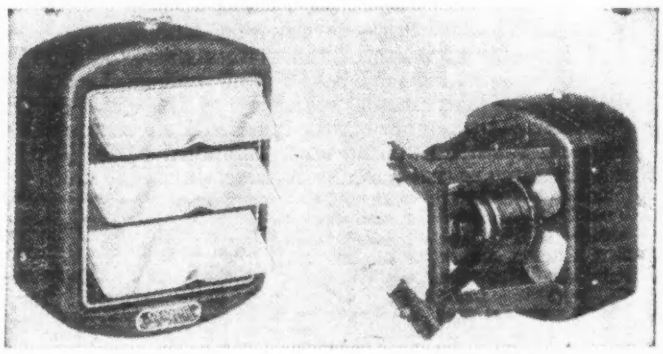
Chanson Introduces Three Hot Water Heaters



NEW de luxe Chanson hot water type heater

Three new models of hot-water type heaters for automobiles are announced by the Chanson division, Illinois Iron and Bolt Company, Carpentersville, Ill. They include a standard model, de luxe and a Ford special model.

The de luxe model is equipped with an adjustable swinging bracket which permits the heater to be swung into various positions. Provision is made for directing the heat to the driver's feet.

The radiator core, it is claimed, heats the air to within approximately 20 degrees of the engine-cooling water, with the air passing through the heater at a speed of 500 lineal feet per minute.

All models have a 6½-inch fan driven by an electric motor.

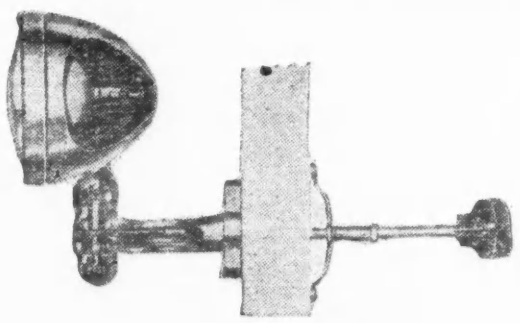
The de luxe models are furnished with a small hand-operated air vent to permit venting the heater when filling the radiator.

The de luxe model is 9⅛ in. high, 7¼ in. wide and 9⅜ in. deep. Both the Ford special and standard models have the same dimensions as the de luxe model except that the depth is 8⅝ in.

All of the models have complete Krinkle finish with the exception of the de luxe model, which has chrome plated shutters and sub-frame.

Announcement is also made of improvements in the hot air and manifold types manufactured by the company.

Federal Makes Motospot



Federal Motospot

A new spotlight, the Motospot, which is claimed to incorporate several new features is announced by Federal Auto Products Company, Chicago, Ill.

In its construction the lamp is locked within the exterior shaft. There are no exposed wires, sliding electrical contact is made under spring pressure. The lamp is controlled for up and down movement and forward and backward movement by a bakelite knob which operates in one plane only. Operating mechanism includes cut gears of hard brass.

The lens is 5½ inches in diameter. It is mounted on a universal bracket and finished in chrome plate. The price is $12.50.

CUMULATIVE NEW PASSENGER CAR REGISTRATION STATISTICS, JUNE, 1931

Returns for today: Wisconsin

States	Auburn	Austin	Buick	Cadillac	Chevrolet	Chrysler	Cord	De Soto	De Vaux	Dodge	Durant	Essex	Ford	Franklin	Graham	Hudson	Hupmobile	La Salle
Illinois	261	10	388	97	2979	416	21	191	35	368	15	229	3429	20	147	88	115	68
Wisconsin	76	2	175	13	1278	117	7	70	35	124	16	107	885	3	37	36	25	12
Totals	337	12	563	110	4257	533	28	261	70	492	31	336	4314	23	184	124	140	80
Ill., 1930	68		656	61	3117	490	26	298		449	71	314	6752	58	232	167	217	80
Wis., '30	19		208	14	1666	168	2	71		170	48	160	2591	14	96	71	36	6
Totals, '30	87	*	864	75	4783	658	28	369	*	619	119	474	9343	72	328	238	253	94

States	Lincoln	Marmon	Nash	Oakland	Oldsmobile	Packard	Peerless	Pierce-Arrow	Plymouth	Pontiac	Reo	Studebaker	Whippet	Willys	Willys-Knight	Miscellaneous	Totals
Illinois	33	8	192	74	560	130	24	26	145	585	22	303	1	213	34	14	11,241
Wisconsin	4	4	149	34	102	24	2	3	97	224	11	102	5	112	12	3	3,906
Totals	37	12	341	108	662	154	26	29	242	809	33	405	6	325	46	17	15,147
Ill., 1930	46	72	405	97	446	323	13	42	543	409	38	422	82	186	88	63	16,339
Wis., '30	1	19	199	60	138	50	10	15	330	207	21	146	69	122	22	15	6,764
Totals, '30	47	91	604	157	584	373	23	57	873	616	59	568	151	308	110	78	23,103

*Not in production

Equipment - - - Development

Malleable Iron

(Continued from Page 6)

change in temperature from room temperature (70 deg. F.) to 200 deg. F., but to drop sharply below 70 deg. F. to Charpy values as low as 3 ft.-lb. at —75 deg. F. compared to about 8 ft.-lb. at 70 deg. F.

Malleable iron, unless heated above the critical temperature, is immune from growth at high temperatures by graphitization, and practically so from growth by oxidation of silicon or migration of gases. In fact, there appears to be no growth of malleable castings at temperatures for which they are intended to be used. Similarly, within the critical temperature there is little tendency to oxidation at high temperatures.

Electrical and Magnetic Properties—The resistivity of malleable iron varies with carbon content and ranges from about 28 to 37 microhms per centimeter cube. Values reported by two investigators follow:

Resistivity (Microhms per Cm. Cube)

	Max.	Min.	Av'ge	No. of Tests
No. 1.....	37	28	30.5	37
No. 2.....	35.02	31.47	33.28	9a

a—Determined at 27.5 deg. C. (81.5 deg. F.).

Magnetization Properties; Permeability—Magnetization curves for various malleable irons, as determined by two investigators, are shown in Figs. 3 and 4. In Fig. 3 the magnetizing force, H, and the induction, B, are recorded in c. g. s. units; in Fig. 4 they are recorded as ampere turns per inch and lines per square inch, respectively. The latter figure covers considerably higher ranges of magnetizing force than the former.

The permeability, Mu, is expressed by the equation Mu equals B/H, and may be determined for various inductions from the curves of Figs. 3 and 4.

Magnetic Hysteresis—Fig. 5 shows a typical magnetic hysteresis curve for malleable iron.

Machineability—The machineability of malleable castings cannot be dealt with quantitatively, since there is no generally accepted test procedure or unit of measurement. It is generally known that as measured by tool life or cutting speed in commercial operations, malleable iron machines more readily than any other ferrous material.

Although there are differences of opinion as to whether variations in tensile properties of malleable iron are accompanied by variations in machineability, it may be said that for practical purposes such variations are not sufficient to contradict the preceding statement for any normal grade of malleable iron. Obviously, metal which accidentally or purposely contains pearlite is not included in this generalization.

Where the machine and tool setup permits, it is standard practice to take roughing cuts of 1/16 to 3/4 in. with a feed of .02 to .03 in. at cutting speeds of 120 to 135 ft. per min., and finishing cuts of .01 to .02 in. with a feed of .010 to .015 in. at cutting speeds of 200 to 220 ft. per min. This contemplates the use of ordinary high-speed tools; much higher speeds are obtainable with some of the more modern cutting alloys.

Test data by a particular method of test covering a variety of products are contained in a paper presented before the society by H. A. Schwartz and W. W. Flagle in 1923. Reference should also be made to the accompanying paper by O. W. Boston on "An Investigation of Methods to Determine the Machineability of Malleable Iron Castings," also presented before the society.

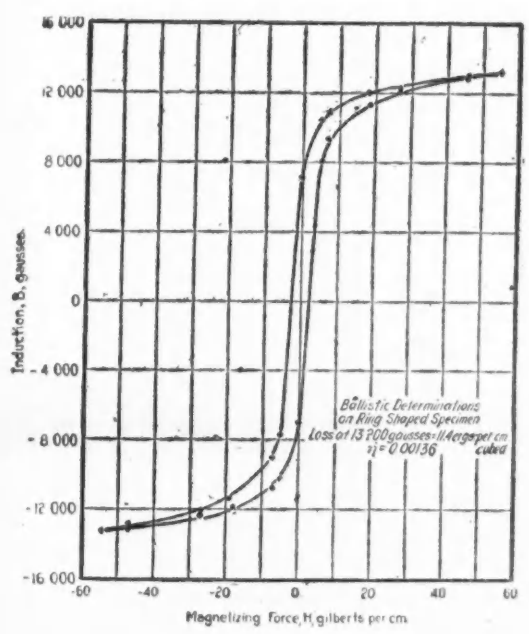


FIG. 5. Magnetic hysteresis curve for malleable iron

22 Years

of progressive engineering are incorporated in

Brockway-Indiana Trucks

They comprise every up-to-the-minute feature of design that engineering science has contributed to modern performance. Today these fast, sturdy new models offer an unparalleled value to the truck buyer looking for service and results.

BROCKWAY MOTOR TRUCK CORP.,
General Office
Cortland - - - - New York

BRUNNER MAKES SIX NEW AIR TOOLS

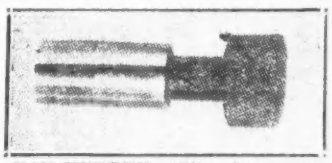
BRUNNER MODEL 89 spring spraying outfit, with No. 86 gun

A new line of air tools manufactured by the Brunner Manufacturing Company, Utica, N. Y., is now ready for delivery. It includes the Model 89 spring spraying outfit, No. 88 spring sprayer, No. 87 engine cleaner, No. 86 blow gun, No. 90 car-washing fluid sprayer and No. 32 safety valve.

The spring spraying outfit is priced at $24. It includes a five-gallon seamless drawn steel tank, 8 feet hose, No. 86 gun, air gauge, Schrader valve, shut-off valve.

Prices for the other items are spring sprayer, $8; engine cleaner, $5.50; blow-gun, $4.50; car-washing fluid sprayer with 18-gallon tank, No. 86 gun, twenty-five feet hose, air gauge, shutoff and relief valves, $35; the No. 32 safety valve, $3.

VAN KEUREN UTILITY PLUG GAUGE HAS FRONT TAPER FEATURE



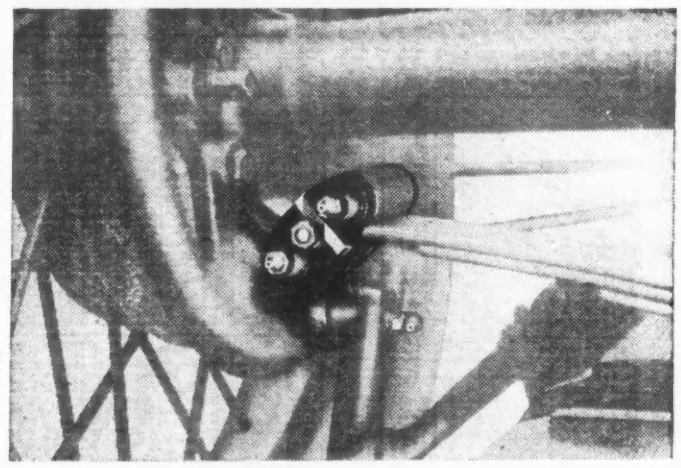
VAN KEUREN utility plug gauge

For measuring holes during lapping, grinding or boring, a combination straight end taper plug gauge has been developed by the Van Keuren Company, Watertown, Mass.

The essential feature of this gauge is that a taper of 0.010 inch in a one-half-inch length is ground on the entering end of the plug, the remaining portion being precision lapped to the desired size of the hole. The distance that the plug enters indicates how much stock remains in the hole and just how much of a cut is required to bring the hole to finish size. If the plug just enters, there is 0.10 inch to be removed. If it enters to a point half-way up on the taper, the required stock removal is 0.005 inch; three-quarters of the way, 0.0025 inch. The distance on the taper may be measured with an inch scale divided in twentieths, each twentieth corresponding to an increase of 0.001 inch on the taper portion.

The gauge is available in standard fractional sizes up to 1 inch and also in special sizes. If desired, it may be used as the "Go" member in the standard American gauge design handles with a "Not Go" unit on the opposite end.

Tryon Shackles for Fords



TRYON SHACKLES for Ford "A" and "AA" models

Tryon shackles for Models "A" and "AA" Fords are announced by Thompson Products, Inc. The new Ford shackle will be sold to the trade only by Thompson jobbers.

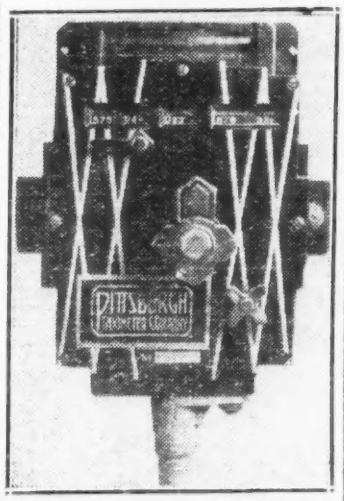
The Ford Tryon shackle, it is claimed, eliminates lubrication troubles by providing hollow pins which act as storage chambers for the lubricant which works about the bearing surfaces as the shackle function. Lubrication is said to be positive with no possibility of clogging. One charge lubricates the shackle for 3,000 to 5,000 miles, the manufacturer states.

A tension spring maintains proper clearances between the bearings and adjustment for wear is made by taking up a single bolt.

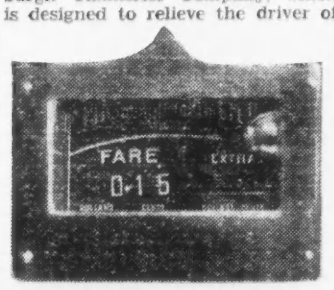
Installation is made by driving in the Tryon pins after the old bolts and bushings have been removed. It is not necessary to ream bushings or perches.

PITTSBURGH TAXIMETER REGISTERS FARE WHEN PASSENGER IS SEATED

A new taximeter, the joint development of the Checker Cab Manufacturing Company and the Pittsburgh Taximeter Company, which is designed to relieve the driver of the responsibility of setting the meter, as well as to assure the passenger of an accurate fare, is announced.



PASSENGER'S view of new taximeter



DRIVER can read fare through small window above the meter

The new meter is automatically operated by electrical controls and is put into operation by the passenger seating himself in the rear seat or either of the drop seats.

The cabs are specially constructed for the use of the new instrument, the controls of which are built between the partitions of the cab.

The meter is built in so that the fare registered is visible to the passenger. The driver can read the fare through a small window above the meter by means of an arrangement of mirrors.

HEAVY loads, high speeds, rough roads—these arduous operating conditions determine the exacting specifications to which Wisconsin Axles must conform.

WISCONSIN AXLES

WISCONSIN AXLE CO.
Oshkosh Wisconsin

Cumulative New Commercial Car Registration Statistics, June, 1931

States	Autocar	Brockway-Indiana	Chevrolet	Diamond-T	Dodge	Federal	Ford	G. M. C.	International	La France-Republic	Mack	Reo	Sterling	Stewart	Studebaker	Whippet	White	Willys	Willys-Knight	Miscellaneous	Totals	States
Illinois	8	3	350	29	51	2	421	12	98		8	6	1	3	15			18		31	1056	Illinois
Illinois, 1930	1		442	58	45	4	590	28	110		9	18	2	1		6	8	5	2	56	1385	Illinois, 1930

Major Specifications and Mechanical Details of 1931 Commercial Cars

Make and Model	Capacity—Tons or Lbs.	Chassis Price	Engine	Valve Arr'g'm't	No. of Cyls.	Bore and Stroke	Piston Disp.	Tax H. P.	Max. Brake H. P. and Peak R. P. M.	Type Camshaft Drive	Radiator Make	Clutch Make	Universals Make	Steering Gear Make	Carburetor Make	Fuel Feed Type	Make Electr'l System	Make Transmission	No. Spds. For.	Rear Axle Make	Type Final Drive	Final Gear Reduction	Type Service Brakes	Area Service Brakes	Standard Wheel Base	Chassis Wgt.	Standard Tire Sizes Front	Rear
*Am La France Chief	2½	3650	Own	L	6	3¾x5	331.0	33.7	65@2100	G	G & O	Borg	Spic	Ross	Str	Vac	DR	Own	4	Tim	Wo	31.2	B4IMV	—	156	6200	32x6	32x6D
*Am. La France Chieftain	3-4	6725	Own	L	6	4½x6	411.0	40.8	85@1800	G	G & O	Borg	Spic	Ross	Zen	Vac	DR	Own	4	Tim	Wo	28.8	B4IMV	—	175	7200	36x8S	36x8D
Am. La France Big Chief	6	5500	Own	L	6	4⅛x5½	572	48.6	115@1600	—	—	Own	—	Ross	Zen	Vac	DR	Own	4	Own	2 R	32.8	W4IA	—	226	10600	40x8S	40x8SD
Austin	400	475	Own	L	4	2.2x3	45.6	7.8	13@3000	G	Hex	Rock	Spic	Own	Til	Gra	Aut	W-G	3	Sal	Sp	5.25	O4M	76.5	75	1210	3.75x18	3.75x18
Autocar A	1½-2	3200	Own	L	6	4 x4¾	358.0	38.4	82@2400	G	Per	Long	Spic	Ross	Str	Vac	DR	Br-L	4	Own	Sp	27.9	LO4ID	460	150	5060	34x7	34x7
Autocar D	2-2½	3500	Own	L	6	4 x4¾	358.0	38.4	82@2400	G	Per	Long	Spic	Ross	Str	Vac	DR	Br-L	4	Own	2 R	33.5	LO4ID	450	150	5300	34x7	34x7D
†Autocar SH	2½-3	4300	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Gra	DR	Own	4	Own	2 R	44.0	O2IM	328	114	6770	34x7	34x7D
Autocar SCH	2½-3	4300	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	4	Own	2 R	44.0	O2IM	328	157	6860	34x7	34x7D
†Autocar H	3	4100	Own	L	4	4½x5½	350.0	32.4	45@1450	G	Own	Long	Spic	Ross	Str	Gra	DR	Own	4	Own	2 R	48.6	O2IM	328	114	6770	34x7	34x7D
†Autocar HS	3½	4600	Own	L	4	4½x5½	350.0	32.4	45@1450	G	Own	Long	Spic	Ross	Str	Gra	DR	Own	4	Own	2 R	54.3	O2IM	516	114	7900	40x8	40x8D
†Autocar SHS	3-3½	4800	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Gra	DR	Own	4	Own	2 R	54.3	O2IM	516	114	7900	40x8	40x8D
Autocar SCHS	3-3½	4800	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	4	Own	2 R	54.3	O2IM	516	157	8180	40x8	40x8D
Autocar N*	3-3½	4600	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	4	Own	2 R	41.2	OL4IH	574	174	7990	38x8	38x8D
Autocar TEA	3-3½	5350	Own	L	6	4¼x4¾	404.0	43.4	92@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	12	Own	2 R	101.1	LO4ID	602	192	8900	36x8	36x8D
Autocar TFA	3½-5	6100	Own	L	6	4½x4¾	453.0	48.6	101@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	12	Own	2 R	101.3*	LO4ID	602	192	9300	38x9	38x9D
Autocar C	3½-5	5500	Own	L	6	4½x4¾	453.0	48.6	101@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	4	Own	2 R	51.7	O2IM	516	172	9500	42x9	42x9D
Autocar CE	7½	6000	Own	L	6	4½x4¾	453.0	48.6	101@2400	G	Own	Long	Spic	Ross	Str	Vac	DR	Own	4	Own	2R	51.7	LO41V	670	172	10500	36x7S	40x8SD
Autocar F	7½	6800	Own	L	6	4½x4¾	453.0	48.6	101@2400	G	Own	Br-L	Spic	Ross	Str	Vac	DR	Br-L	7	Tim	Wo	94.0	LT4DV	674	173	11000	36x7S	40x8SD
*Autocar G	10	9000	Own	L	6	4½x4¾	453.0	48.6	101@2400	G	Own	Br-L	Spic	Ross	Str	Vac	DR	Br-L	7	Tim	Wo	100.0	T6IA	720	171	13000	36x8	36x8D
Brockway 60	*6000	995	Con	L	6	3⅜x4	214.7	27.3	61@3000	C	G & O	Borg	Spic	Ross	Zen	P	Aut	W-G	3	Col	Sp	19.8	B4IM	297	132	3200	30x5	30x5
Brockway 65	6500	1195	Con	L	6	3⅜x4⅝	248.2	27.3	65@2700	C	G & O	Borg	Spic	Ross	Zen	Vac	Aut	Br-L	3	Col	Sp	21.3	C4IM	244	137	3400	30x5	30x5
Brockway 75	7500	1290	Con	L	6	3⅜x4⅝	248.2	27.3	65@2700	C	G & O	Borg	Spic	Ross	Zen	Vac	Aut	Br-L	4	Col	Sp	25.6	C4IM	244	137	3450	32x6	32x6
Brockway 90	9000	1525	Con	L	6	3⅜x4⅝	248.2	27.3	65@2700	C	G & O	Borg	Spic	Ross	Zen	Vac	Aut	Br-L	4	Col	Sp	20.9	C4IM	292	149	4050	32x6	32x6
Brockway 120	12000	1990	Con	H	6	4 x4⅝	311.0	38.4	73@2400	C	G & O	Br-L	Spic	Ross	Zen	P	Aut	Br-L	4	Tim	Sp	31.3	L4IH	353	156	5200	32x6	32x6D
Brockway 140	14000	2495	Con	H	6	4 x4⅝	311.0	38.4	73@2400	C	G & O	Br-L	Spic	Ross	Zen	P	Aut	Br-L	4	Wis	2 R	35.3	L4IHV	356	156	5500	32x6	32x6D
Brockway 141	17000	2935	Con	H	6	4 x4⅝	311.0	38.4	73@2400	C	G & G	Br-L	Spic	Ross	Zen	P	Aut	Br-L	4	Wis	2 R	46.2	L4IHV	356	170	6200	32x6	32x6D
Brockway 170	17000	3160	Con	H	6	4⅛x4¾	380.9	40.8	89@2400	C	G & O	Br-L	Spic	Ross	Zen	P	Aut	Br-L	4	Wis	2 R	46.6	L4IHV	380	170	6800	32x6	32x6D
Brockway 175	17500	3660	Con	H	6	4⅜x4¾	427.5	45.9	100@2400	C	G & O	—	Spic	Ross	Zen	P	Aut	—	5	Wis	2 R	45.3	L4IHV	380	170	7200	34x7	34x7D
Brockway 195	19500	3820	Con	H	6	4⅛x4¾	380.9	40.8	89@2400	C	G & O	Br-L	Spic	Ross	Zen	P	Aut	Br-L	4	Wis	2 R	49.5	L4IHV	471	170	7500	34x7	34x7D
Brockway 190	19000	4185	Con	H	6	4⅛x4¾	380.9	40.8	89@2400	C	Long	Borg	Spic	Ross	Zen	P	Aut	Br-L	7	Tim	Wo	78.6	T2IMV	471	168½	7625	34x7	34x7D
Brockway 220	22000	4560	Con	H	6	4⅜x4¾	427.5	45.9	100@2400	C	G & O	Br-L	Spic	Ross	Zen	P	Aut	Br-L	4	Wis	2 R	50.7	L4IHV	546	170	8200	36x8	36x8D
Brockway 250	25000	5950	Con	H	6	4⅜x4¾	427.5	45.9	100@2400	C	Long	Br-L	Spic	Ross	Zen	P	Aut	Br-L	4	Tim	Wo	63.7	LT4IVA	664	182	10000	40x8	40x8D
Brockway 290	30000	7250	Con	L	6	4⅜x5¾	611.4	54.1	116@1800	C	Long	Br-L	Spic	Ross	Str	P	L-N	Br-L	7	Tim	Wo	95.0	T4IA	676	182	10750	38x7P	40x14S
*Brockway 640	40000	9700	Con	L	6	4¾x5¾	611.4	54.1	116@1800	C	Long	Br-L	Spic	Ross	Str	P	L-N	Br-L	7	Tim	Wo	90.9	T4IA	864	212	14000	38x7P	36x10S
Chevrolet	½	355	Own	H	6	3⅛x3⅜	194.0	26.3	50@2600	G	Har	Own	Own	Own	Car	P	DR	Own	3	Own	Sp	13.6	O4IM	101	109	1880	19x4.75	19x4.75
Chevrolet	1½	590	Own	H	6	3⅛x3⅜	194.0	26.3	50@2600	G	Har	Own	Own	Own	Car	P	DR	Own	4	Own	Sp	33.4	O4IM	170	157	3015	30x5	30x5D
Chevrolet	1½	520	Own	H	6	3⅛x3⅜	194.0	26.3	50@2600	G	Har	Own	Own	Own	Car	P	DR	Own	4	Own	Sp	33.4	——	—	131	2700	30x5	32x6
Commerce Series S 11	1	1600	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Col	Sp	25.5	L4IH	297	142	3900	30x5P	30x5P
Commerce Series S 11	1½	1900	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Sp	29.2	L4IH	297	162	4300	30x5P	30x5DP
Commerce Series 40	1½	2990	Bud	L	6	3⅝x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Wo	34.8	L4IH	394	168	4700	34x5P	34x5DP
Commerce Series S 11	2	2030	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Sp	29.2	L4IH	297	162	4500	32x6P	32x6D
Commerce Series 40	2	3240	Bud	L	6	3⅝x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Wo	34.8	L4IH	394	168	4900	32x6	36x6D
Commerce Series 40	2½	3240	Bud	L	6	3⅝x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Wo	34.8	L4IH	394	168	5100	36x6P	36x6D
Commerce Series 60	2½	4580	Bud	L	6	4⅛x5⅛	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Tim	Wo	63.0	L4IH	584	175	7000	36x6P	36x6D
Commerce Series 60	3	4680	Bud	L	6	4⅛x5⅛	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Tim	Wo	63.0	L4IH	584	175	7100	36x6P	38x7D
Commerce Series 80	3½	5250	Bud	L	6	4⅛x5⅛	411.0	40.8	83@2100	G	Long	Own	Blo	Ross	Zen	Vac	Aut	Br-L	7	Tim	Wo	98.2	——	—	175	8200	36x6S	36x6S
Commerce Series 80	4	5330	Bud	L	6	4⅛x5⅛	411.0	40.8	83@2100	G	Long	Own	Blo	Ross	Zen	Vac	Aut	Br-L	7	Tim	Wo	98.2	——	—	175	8400	36x6S	36x14S
Commerce Series 100	5	5830	Bud	L	6	4⅛x5⅛	411.0	40.8	83@2100	G	Long	Own	Blo	Ross	Zen	Vac	Aut	Br-L	7	Tim	Wo	95.0	——	—	175	9600	36x6S	40x14S
Day Elder 60	1	1095	Con	L	6	3¾x4	214.7	27.3	61@3000	C	G & O	Borg	Spic	Ross	Zen	P	DR	W-G	4	Tim	Sp	36.3	B4IM	241	135	3200	20x6.00B	20x6.50B
Day Elder 85	1½	1645	Con	L	6	3¾x4⅝	248.3	27.3	65@2700	C	Per	Borg	Spic	Ross	Zen	P	DR	W-G	4	Tim	Sp	42.3	L4IH	229	135	3750	20x6.00B	20x6.50DB
Day Elder 110	2	2095	Con	L	6	3¾x4⅝	248.3	27.3	65@2700	C	Per	Br-L	Spic	Ross	Zen	P	DR	Br-L	4	Tim	Sp	44.9	L4IH	306	156	4600	20x7.00B	20x7.00DB
Day Elder 130	2½	2895	Con	H	6	4 x4⅛	311.0	38.4	73@2400	C	Per	Br-L	Spic	Ross	Zen	P	DR	Br-L	4	Tim	Sp	40.7	L4IH	354	157	6400	20x7.50B	20x7.50DB
Day Elder 160	3	3695	Con	H	6	4 x4½	339.3	38.4	82@2400	C	Per	Br-L	Spic	Ross	Zen	P	DR	Br-L	4	Tim	Wo	36.1	L4IH	398	156	6600	20x7.50B	20x9.00DB
Day Elder 200	4	4295	Con	H	6	4 x4½	339.3	38.4	82@2400	C	Per	Br-L	Spic	Ross	Zen	P	DR	Br-L	4	Tim	Wo	42.5	L4IHV	489	156	7400	20x9.00B	20x9.00B
Day Elder 240	5	5500	Con	H	6	4⅜x4⅜	427.5	45.9	100@2600	C	Per	Br-L	Blo	Ross	Zen	Vac	DR	Br-L	4	Tim	Wo	50.8	L4IHV	520	162	9300	38x9P	38x9DP
*Day Elder 285	8	6000	Con	H	6	4⅜x4⅜	427.5	45.9	100@2600	C	Per	Br-L	Blo	Ross	Zen	Vac	DR	Br-L	7	Tim	Wo	71.2	L6IHV	674	164	12000	20x8.25B	20x8.25DB
*Day Elder 345	10	7500	Con	H	6	4⅜x4⅜	427.5	45.9	100@2600	C	Per	Br-L	Blo	Ross	Zen	Vac	DR	Br-L	7	Tim	Wo	79.9	W6IA	400	164	12500	20x9.00B	20x9.00DB
*Day Elder 402	13	9000	Con	L	6	4¾x5¾	611.4	54.2	127@2300	G	Per	Br-L	Blo	Ross	Zen	P	DR	Br-L	7	Tim	Wo	84.6	W6IA	490	164	14000	20x9.75B	20x9.75DB
Diamond T 216	1½	695	Her	L	6	3¾x4¼	228.0	27.3	56@2400	G	G & O	Borg	Spic	Ross	Zen	P	Aut	W-G	4	Cla	Sp	——	L41H	252	135½	3130	20x6.50B	20x6.50B
Diamond T 291	1½-2	1325	Her	L	6	3¾x4½	268.0	29.4	60@2400	G	G & O	Borg	Spic	Ross	Zen	P	Aut	Cov	4	Cla	Sp	——	L4IH	279	156¼	4500	20x6.50B	20x6.50DB
Diamond T 303	2-2½	1585	Her	L	6	3¾x4½	298.0	33.7	67@2400	G	G & O	Borg	Spic	Ross	Zen	P	Aut	Cov	4	Cla	Sp	——	L4IHV	350	159¾	5000	20x7.00B	20x7.00DB
Diamond T 551	2½-3	2050	Her	L	6	4 x4½	339.0	38.4	74@2400	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Cov	4	Tim	Sp	——	L4IHV	408	168	5600	20x7.50B	20x7.50DB
Diamond T 504	3	2375	Her	L	6	4 x4½	339.0	38.4	74@2400	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Cov	4	Wis	2 R	——	L4IHV	408	184	6400	20x8.25B	20x8.25DB
Diamond T 506	3	2675	Her	L	6	4¼x4½	383.0	43.3	85@2200	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Cov	5	Wis	2 R	——	L4IHV	499	169	7500	20x9.00B	20x9.00DB
Diamond T 603	3-4	2975	Her	L	6	4¾x4½	428.4	45.9	94@2200	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Cov	5	Wis	2 R	——	L4IHV	499	187½	7500	20x9.00B	20x9.00DB
Diamond T 605	3-4	3075	Her	L	6	4¼x4¾	453.0	48.6	100@2200	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Cov	5	Wis	2 R	——	W4I	552	178	8300	22x9.75B	22x9.75DB
Diamond T 750	4-5	4100	Her	L	6	4⅝x5½	529.0	51.3	—	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Br-L	7	Own	Wo	——	L6IHV	571	189½	8300	36x8P	36x8DP
*Diamond T 801	4	4140	Her	L	6	4¾x4¾	428.4	45.9	94@2200	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Br-L	7	Tim	Wo	——	T4IA	238	190	11000	34x7P	34x7DP
*Diamond T 1200	6	5600	Her	L	6	4½x4¾	453.3	48.6	100@2200	G	G & O	Cov	Spic	Ross	Zen	P	Aut	Br-L	7	Tim	Wo	——	T4IA	238	190	11700	36x8P	36x8DP
*Diamond T 1600	8	6220	Her	L	6	4⅝x4¾	479.0	51.3	104@2400	G	G & O	Cov	Spic-Blo	Ross	Zen	P	Aut	Br-L	7	Tim	Wo	——	T4IA	238	194	12500	36x8P	36x8D
*Diamond T 1601	8	7500	Wak	L	6	5 x5¾	677.4	60.0	127@2000	G	G & O	Br-L	Spic-Blo	Ross	Zen	P	DR	Br-L	7	Tim	Wo	——	T4IA	238	194	12500	36x8P	36x8D
Dodge Bros. UF 10	½	435	Own	L	4	3¼x4¾	196.0	21.0	48@2800	G	Fed	Borg	Own	W-G	Car	P	DR	Own	3	Own	Sp	14.2	L4IH	114	109	1925	19x5.00	19x5.00
Dodge Bros. F 10	½	515	Own	L	6	3¼x4¼	211.5	25.3	66@3200	C	Fed	Borg	Un	W-G	Car	P	DR	Own	3	Own	Sp	14.2	L 4IH	114	109	1975	19x5.25	19x5.25
Dodge Bros. U 1	¾	490	Own	L	4	3¾x4¼	196.0	21.0	45@2800	G	Fed	Borg	Spic	Han	Car	Vac	NE	Own	3	Own	Sp	21.6	L4IH	189	124	2260	20x6.00	20x6.00
Dodge Bros. DA 1	¾	595	Own	L	6	3¾x3⅞	208.0	27.3	63@3200	C	Fed	Borg	Spic	Han	Zen	Vac	NE	Own	4	Own	Sp	36.8	L4IH	189	124	2360	20x6.00	20x6.00
Dodge Bros.	1	495	Own	L	4	3¾x4¼	196.0	21.0	45@2800	G	Fed	Borg	Spic	Han	Car	Vac	NE	Own	3	Own	Sp	36.1	L4IH	205	133	2590	20x6.00	32x6
Dodge Bros.	1	595	Own	L	6	3¾x3⅞	208.0	27.3	63@3200	C	Fed	Borg	Spic	Han	Zen	Vac	NE	Own	3	Own	Sp	33.4	L4IH	205	133	2690	20x6.00	32x6
Dodge Bros. UF 30	1½	595	Own	L	4	3¾x4¾	196.0	21.0	48@2800	G	Fed	Borg	Cle	W-G	Car	P	DR	Own	4	Own	Sp	37.1	L4IH	120	136	2581	20x6.00	32x6
Dodge Bros. UF 31	1½	670	Own	L	4	3¾x4¾	196.0	21.0	48@2800	G	Fed	Borg	Cle	W-G	Car	P	DR	Own		Own	Sp	32.1	L4IH	229	165	2757	20x6.00	32x6
Dodge Bros. F 31	1½	770	Own	L	6	3¼x4¼	211.5	25.3	66@3200	G	Fed	Borg	Cle	W-G	Car	P	DR	Own		Own	Sp	32.1	L4IH	229	165	2807	20x6.00	32x6
Dodge Bros. F 30	1½	695	Own	L	6	3¼x4¼	211.5	25.3	66@3200	C	Fed	Borg	Cle	W-G	Car	P	DR	Own	4	Own	Sp	37.1	L4IH	120	136	2631	20x6.00	32x6
Dodge Bros. F 35	1½	1425	Own	L	6	3⅜x3⅞	208.0	27.3	63@3200	G	Long	Borg	Cle	Han	Zen	P	DR	Own	4	Own	Sp	41.4	L4IH	311	149	3780	20x6.00	20x6.00D
Dodge Bros. F 36	1½	1485	Own	L	6	3⅜x3⅞	208.0	27.3	63@3200	G	Long	Borg	Cle	Han	Zen	P	DR	Own	4	Own	Sp	41.4	L4IH	311	149	3972	20x6.00	20x6.00D
*Dodge Bros. F 40	2	1995	Own	L	6	3⅝x5	309.6	31.5	96@3000	G	Long	Borg	Cle	Sag	DL	P	DR	Own	4	Own	Sp	43.7	L4IH	350	150	5173	20x6.50	20x6.50D
*Dodge Bros. F 41	2	2085	Own	L	6	3⅝x5	309.6	31.5	96@3000	G	Long	Borg	Cle	Sag	DL	P	DR	Own	4	Own	Sp	43.7	L4IH	350	165	5211	20x6.50	20x6.50D
Dodge Bros.	3	1515	Own	L	6	3⅜x4½	241.0	27.3	78@3000	C	Long	Borg	Un	Han	Zen	Vac	NE	Own	4	Own	Sp	46.3	L4IH	382	135	4235	32x6	32x6D
Dodge Bros.	3	1565	Own	L	6	3⅜x4½	241.0	27.3	78@3000	C	Long	Borg	Un	Han	Zen	Vac	NE	Own	4	Own	Sp	41.4	L4IH	382	165	4520	32x6	32x6D
Dodge Bros.	3	1615	Own	L	6	3⅜x4½	241.0	27.3	78@3000	C	Long	Borg	Un	Han	Zen	Vac	NE	Own	4	Own	Sp	46.3	L4IH	382	185	4715	32x6	32x6D
Dodge Bros. F 60	3	2645	Own	L	6	3⅝x5	309.6	31.5	96@3000	G	Long	Borg	Cle	Sag	DL	P	DR	Own	4	Own	2 R	48.8	L4IH	416	146	5543	32x6	32x6D
*Dodge Bros. F 61	3	2575	Own	L	6	3⅝x5	309.6	31.5	96@3000	G	Long	Borg	Cle	Sag	DL	P	DR	Own	4	Own	Sp	48.8	L4IH	416	170	5789	32x6	32x6D
*Dodge Bros. F 62	3	2695	Own	L	6	3⅝x5	309.6	31.5	96@3000	G	Long	Borg	Cle	Sag	DL	P	DR	Own	4	Own	Sp	48.8	L4IH	416	195	5901	32x6	32x6D
Essex Com.	¾	445	Own	L	6	2¾x4½	163.0	18.2	55@3300	C	Har	Own	Spic	Gem	Mar	Vac	Aut	Own	3	Own	Sp	—	4M	—	110	2125	20x5	20x5.50
Federal D	1½	795	Con	L	6	3⅞x4¼	200.5	24.0	48@2500	C	Long	Borg	Spic	Gem	Zen	P	DR	W-G	4	Cla	Sp	40.8	L4IH	377	131	3280	20x6.00	32x6
Federal E 6	1½	895	Con	L	6	3⅜x4	215.0	27.3	60@2600	C	Long	Borg	Spic	Gem	Zen	P	DR	W-G	4	Cla	Sp	36.3	L4IH	377	132	3330	20x6.00	32x6
Federal F 7	1¾	1525	Con	L	6	3⅜x4⅝	248.0	27.3	64@2500	C	Long	Borg	Spic	Gem	Zen	P	DR	Own	4	Tim	Sp	29.2	L4IH	414	132	3810	30x5	30x5D
Federal A 6	2	1855	Con	L	6	3⅜x4⅝	248.0	27.3	64@2500	C	Long	Borg	Pet	Ross	Zen	Vac	DR	Own	4	Cla	Sp	38.5	L4IH	450	151	4635	32x6	32x6D
Federal A 6 T	2½	2185	Con	L	6	3⅜x4⅝	248.0	27.3	64@2500	C	Long	Borg	Pet	Ross	Zen	Vac	DR	Own	4	Tim	Sp	47.1	L4IHV	659	151	5185	32x6	32x6D
Federal A 6 T W	2½	2360	Con	L	6	3⅜x4⅝	248.0	27.3	64@2500	C	Long	Borg	Pet	Ross	Zen	Vac	DR	Own	4	Tim	Wo	52.8	L4IHV	659	151	5185	32x6	32x6D
*Federal D S W	2½-3	1050	Con	L	4	3⅞x4¼	200.5	24.0	48@2500	C	Long	Borg	Spic	Gem	Zen	P	DR	W-G	4	Cla	Sp	40.8	L6IH	566	140	3980	20x6.00	32x6
*Federal E 6 S W	2½-3	1150	Con	L	6	3⅜x4	215.0	27.3	60@2600	C	Long	Borg	Spic	Gem	Zen	P	DR	W-G	4	Cla	Sp	40.8	L6IH	566	145	4030	20x6.00	32x6
Federal T 10 B	2½-3	2740	Con	H	6	4 x4⅛	311.0	38.4	75@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Own	4	Tim	Sp	44.5	L4IHV	659	165	6645	34x7	34x7D
Federal T 10 W	2½-3	2915	Con	H	6	4 x4⅛	311.0	38.4	75@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Own	4	Tim	Wo	44.0	L4IHV	659	165	6645	34x7	34x7D
Federal T 10 D R	2½-3	2915	Con	H	6	4 x4⅛	311.0	38.4	75@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Own	4	Tim	2 R	45.6	L4IHV	659	165	6645	34x7	34x7D
Federal U 6	3-3½	3860	Con	H	6	4 x4½	339.0	38.4	85@2200	C	Long	Borg	Pet	Ross	Str	P	DR	Br-L	7	Tim	Wo	64.6	L4IHV	676	165	7315	34x7	34x7D
Federal U 6 D R	3-3½	3860	Con	H	6	4 x4½	339.0	38.4	85@2200	C	Long	Borg	Pet	Ross	Str	P	DR	Br-L	7	Tim	2 R	69.6	L4IHV	767	165	7315	34x7	34x7D
Federal 4 C 6 A	4-5	4735	Con	H	6	4½x4¾	381.0	40.8	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	Wo	72.2	L4IHV	894	192	8460	36x8	36x8D
Federal 4 C 6 A D R	4-5	4735	Con	H	6	4½x4¾	381.0	40.8	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	2 R	80.6	L4IHV	894	192	8460	36x8	36x8D
Federal 4 C 6 A B	4-5	4960	Con	H	6	4½x4¾	381.0	40.8	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	Wo	72.2	T4IA	921	192	8980	36x8	36x8D
Federal 4 C 6 A B D R	4-5	4960	Con	H	6	4½x4¾	381.0	45.9	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	2 R	80.6	T4IA	421	192	8980	36x8	36x8D
*Federal U 6 S W	6	6000	Con	H	6	4½x4¾	380.9	40.8	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	Wo	71.3	L6IHV	1093	201	10395	34x7	34x7D
*Federal U 6 S W A B	6	6500	Con	H	6	4½x4¾	380.9	40.8	90@2200	C	Long	Borg	Pet	Ross	Zen	P	DR	Br-L	7	Tim	Wo	71.3	TrIA	867	201	10395	34x7	34x7D
Federal X 8	7½	5085	Con	L	4	5 x6	471.0	40.0	61@1350	G	Long	Borg	Pet	Gem	Zen	Vac	AB	Br-L	7	Tim	Wo

Major Specifications and Mechanical Details of 1931 Commercial Cars

(CONTINUED FROM PAGE EIGHT)

Make and Model	Capacity—Tons or Lbs.	Chassis Price	Engine	Valve Arr'g'm't	No. of Cyls.	Bore and Stroke	Piston Disp.	Tax H. P.	Max. Brake H. P. and Peak R. P. M.	Type Camshaft Drive	Radiator Make	Clutch Make	Universals Make	Steering Gear Make	Carburetor Make	Fuel Feed Type	Make Electr'l System	Make Transmission	No. Spds. For.	Rear Axle Make	Type Final Drive	Final Gear Reduction	Type Service Brakes	Area Service Brakes	Standard Wheel Base	Chassis Wgt.	Standard Tire Sizes Front	Rear
General Motors T 42	*15000	1845	Buick	H	6	3½x4⅝	257.5	28.3	76@2500	G	Long	Own	Spic	Sag	Mar	P	DR	Mun	4	Eat	Sp	33.4	B4IM	524	141	4725	32x6P	32x6DP
General Motors T-44	*16000	2095	Buick	H	6	3½x4⅝	257.5	28.3	76@2500	G	Long	Own	Spic	Sag	Mar	P	DR	Mun	4	Eat	2 R	40.9	B4IM	524	141	7005	34x7P	34x7DP
General Motors T-51	*19000	2565	Own	H	6	3⅝x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Mar	P	DR	Mun	4	Eat	Sp	40.6	B4IM	574	155	5955	34x7P	34x7DP
General Motors T-55	*19000	2690	Own	H	6	3⅝x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Mar	P	DR	Mun	4	Eat	2 R	49.8	B4IM	574	155	6095	34x7P	34x7DP
General Motors T-60	*22000	3035	Buick	H	6	3⅝x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Mar	P	DR	Mun	4	Tim	Wo	52.5	B4IM	685	154	6925	34x7P	34x7DP
General Motors T-61	*22000	3445	Own	H	6	3⅝x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Str	P	DR	Mun	4	Tim	Wo	52.5	B4IMV	685	154	6965	34x7P	34x7DP
General Motors T-82	*24000	3795	Own	H	6	3⅝x5	331.4	33.7	94@2500	G	Long	Own	Pet	Sag	Str	P	DR	Mun	12	Tim	Wo	142.5	B4IM	793	155	7500	20x9.00B	20x9.00DB
General Motors T-83	*24000	3990	Own	H	6	3⅝x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Str	P	Dr	Mun	12	Tim	Wo	142.5	B4IMV	865	155	7670	20x9.00B	20x9.00DB
General Motors T-85	*26000	5600	Own	H	6	3⅝x5	331.4	33.7	94@2500	G	Long	Own	Spic	Sag	Str	P	DR	Ful	4	Tim	2 R	53.3	B4IMV	865	171	10630	20x9.00H	20x9.00DB
†General Motors T-90	*28000	5285	Own	H	6	3⅝x5	331.4	33.7	94@2500	G	Long	Own	Pet	Sag	Str	P	DR	Mun	12	Tim	Wo	129.0	Br1A	868	185	9400	20x9.75B	20x9.75DB
†General Motors T-95	*34000	7545	Own	H	6	4⅛x5½	468.0	43.3	115@2200	C	Long	Own	Spic	Sag	Str	P	DR	Ful	4	Tim	Wo	53.3	B6IA	1191	189	13250	20x7.50B	20x7.50DB
†General Motors T-96	*34000	7195	Own	H	6	4⅛x5½	468.0	43.3	115@2200	C	Long	Own	Spic	Sag	Str	P	DR	Ful	4	Tim	2 R	51.1	B6IA	1191	189	12850	34x7P	34x7DP
																												34x7DP
Gramm A X 4	1	795	Con	L	4	3⅞x4	200.4	24.0	50@2800	C	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	36.3	L4IH	380	131	3300	20x6.00	20x6.50
Gramm A X 6	1	895	Con	L	6	3⅜x4	214.0	27.3	61@3000	C	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	36.3	L4IH	380	131	3550	20x6.00	20x6.50
Gramm B X 4	1½	895	Con	L	4	3⅞x4½	200.4	24.0	50@2800	C	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	36.3	L4IH	380	131	3475	20x6.00	20x6.00D
Gramm B X 6	1½	995	Con	L	6	3⅜x4	214.7	27.3	61@3000	C	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	36.3	L4IH	380	131	3725	20x6.00	20x6.00D
Gramm B	1½	995	Con	L	4	3⅞x4½	224.0	25.3	61@2900	G	Per	Own	Blo	Ross	Zen	Vac	Aut	Cov	4	Tim	Sp	36.3	L4IH	278	140	4150	20x6.50	20x6.00D
Gramm C X 4	1¾	1495	Lyc	L	6	3⅜x4	214.7	27.3	61@3000	C	Per	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	34.3	L4IH	452	131	3900	20x6.50	20x6.50D
Gramm C X 4	2	1095	Con	L	4	3¼x4½	224.0	25.3	61@2900	G	Per	Jon	Blo	Ross	Til	Vac	Aut	Cov	4	Eat	Sp	——	——	452	151	——	30x5	32x6
Gramm C X 6	2	1095	Knight	S	6	4⅛x4¼	227.0	27.2	55@2600	G	Per	Own	Blo	Ross	Zen	P	Aut	W-G	4	Tim	Sp	37.0	L4IH	——	131	4150	20x6.50	20x6.50D
Gramm 21	2	1295	Con	L	6	3⅝x4⅜	177.9	20.7	53@2600	C	Per	Jon	Blo	Ross	Til	Vac	Aut	Cov	4	——	——	——	——	——	164	——	32x6	34x7
Gramm C	2½	1295	Knight	S	6	3⅝x4⅜	248.2	27.3	70@3000	C	Own	Jon	Blo	Ross	Til	P	Aut	W-G	4	Tim	Sp	37.0	L4IH	452	131	4800	20x7.00	20x7.00D
Gramm D	2	1795	Lyc	L	6	3⅝x4½	255.	27.3	70@2600	C	Per	Own	Blo	Ross	Til	Vac	Aut	Cov	4	——	——	——	——	——	190	5200	20x7.50	20x7.50D
Gramm 75	2½	1995	Lyc	L	6	3⅝x4½	278.6	31.5	82@2600	G	Per	Jon	Blo	Ross	Zen	P	Aut	Cov	4	Tim	Sp	31.0	L4IH	353	160	——	20x7.50	20x7.50D
Gramm E	3	2395	Knight	S	6	3⅜x4⅜	299.0	33.7	90@2200	G	Own	Jon	Blo	Ross	Zen	P	Aut	Cov	4	Tim	Sp	33.0	L4IHV	339	160	5200	20x7.50	20x7.50D
Gramm E Y	3	2595	Lyc	L	6	3⅝x5	255.	27.3	70@2600	G	Per	Own	Blo	Ross	Zen	P	Aut	Cov	4	Wis	2R	——	——	——	190	——	20x7.50	20x7.50D
Gramm G Y	3	3595	Con	L	6	3⅞x5	353.8	36.0	90@2200	G	Per	Ful	Blo	Ross	Zen	P	Aut	Cov	4	Tim	Sp	35.0	L4IHV	659	160	5950	20x8.25	20x8.25D
Gramm G W	4	4345	Con	H	6	4⅛x4¾	380.8	40.8	90@2200	C	Per	Ful	Blo	Ross	Zen	P	Aut	Cov	4	Tim	Sp	30.0	L4IHA	——	190	7200	20x7.50	20x7.50D
Gramm H Y	4	5175	Con	H	6	4⅜x4¾	428.4	45.9	100@2200	C	Per	Ful	Blo	Ross	Zen	P	Aut	Cov	4	Wis	2 R	28.0	BW4IM	——	210	7700	20x7.50	20x7.50D
	5	6545	Con	L	6	4⅛x5¾	611.4	54.1	127@2300	G	Per	Ful	Blo	Ross	Zen	P	Aut	Ful	4	Wis	2 R	——	——	——	236	10100	20x8.25	20x8.25D
																										20x9.00	20x9.00D
																										36x8	36x8D
Indiana 60	*6000	995	Con	L	6	3⅜x4	214.7	27.3	61@3000	C	G & O	Borg	Spic	Ross	Zen	P	Aut	W-G	3	Col	Sp	19.8	B4IM	297	132	3200	30x5	30x5
Indiana 64	6500	1195	Con	L	6	3⅜x4⅝	248.2	27.3	65@2700	C	Long	Borg	Spic	Ross	Str	Vac	Aut	Br-L	3	Col	Sp	21.3	C4IM	244	137	3400	30x5	30x5
Indiana 74	7500	1290	Con	L	6	3⅜x4⅝	248.2	27.3	65@2700	C	Long	Borg	Spic	Ross	Str	Vac	Aut	Br-L	4	Col	Sp	25.6	C4IM	190	137	3450	32x6	32x6
Indiana 80	9000	1525	Con	L	6	3⅜x4⅝	248.2	27.3	65@2700	C	Long	Borg	Spic	Ross	Str	Vac	Aut	Br-L	4	Col	Sp	20.9	C4IM	292	149	4050	32x6	32x6
Indiana 111 XW	12500	1850	Her	L	6	3⅜x4⅝	248.2	27.3	65@2700	C	Long	McC	Borg	Spic	Ross	Str	Vac	Aut	Br-L	4	Wis	2 R	35.2	K2IM	270	120	3740	32x6	32x6
Indiana 120	12000	1990	Con	H	6	4 x5	251.3	25.6	46@2000	G	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Tim	Sp	31.3	L4IH	353	156	5200	32x6	32x6D
Indiana 140	14000	2495	Con	H	6	4 x4⅛	311.0	38.4	73@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Wis	2 R	35.3	54IHV	356	156	5500	32x6	32x6D
Indiana 141	17000	2935	Con	H	6	4 x4⅛	311.0	38.4	73@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Wis	2 R	46.2	L4IHV	380	170	6200	32x6	32x6D
Indiana 170	17000	3160	Con	H	6	4 x4⅛	311.0	38.4	73@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Wis	2 R	46.6	L4IHV	380	170	6800	32x6	32x6D
Indiana 175	17500	3660	Con	H	6	4⅛x4¾	380.9	40.8	89@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	—	5	Wis	2 R	45.3	L4IHV	380	170	7200	32x6	32x6D
Indiana 195	19500	3820	Con	H	6	4⅜x4¾	427.5	45.9	100@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	4	Wis	2 R	49.5	L4IHV	471	170	7500	34x7	34x7D
Indiana 190	13000	4185	Con	H	6	4⅛x4¾	380.9	40.8	89@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	7	Tim	Wo	78.6	T2IMV	500	168½	7625	34x7	34x7D
Indiana 220	22000	4560	Con	H	6	4⅛x4¾	380.9	40.8	89@2400	C	G & O	Br-L	Spic	Ross	Str	P	Aut	Br-L	7	Wis	2 R	50.7	L4IHV	546	170	8200	34x7	34x7D
Indiana 250	25000	5950	Con	H	6	4⅜x4¾	427.5	45.9	100@2400	C	Long	Br-L	Spic	Ross	Str	P	L-N	Br-L	7	Tim	Wo	63.7	LT4IHV	664	182	10000	36x8	36x8D
Indiana 290	30000	7250	Con	L	6	4⅜x4¾	427.5	45.9	100@2400	C	Long	Br-L	Spic	Ross	Str	P	L-N	Br-L	7	Tim	Wo	95.0	T4IA	676	182	10750	38x7P	40x8D
Indiana 640	40000	9700	Con	L	6	4⅜x5¾	611.4	54.1	116@1800	C	Long	Br-L	Spic	Ross	Str	P	L-N	Br-L	7	Tim	Wo	90.9	T1IA	864	212	14000	38x7P	40x14S
																												36x10S
International A 2	1½	675	Wak	L	4	3⅝x4½	186.0	21.0	39@2400	G	Mod	Mec	Mec	Ross	Zen	Vac	DR	W-G	4	Own	Sp	39.5	BE4IM	212	136	2800	5.50x20	
International B 2	1½	725	Wak	L	4	3⅝x4½	186.0	21.0	39@2400	G	Mod	Mec	Mec	Ross	Zen	Vac	DR	Mec	3	Own	Sp	47.3	BE4IM	212	136	2830	5.50x20	6.00x26
International A L 3	1½	1450	Lyc	L	6	3¼x4½	224.0	25.3	61@2800	G	Mod	Own	Mec	Ross	Zen	Vac	DR	W-G	4	Own	Sp	42.9	B4IM	295	138	4300	20x6.00	6.00x20
International A 4	2	1660	Own	H	6	3⅝x4½	279.0	31.5	65@2800	G	Mod	Own	Mec	Ross	Zen	Vac	DR	Own	5	Own	Sp	47.8	BE4IM	378	145	5070	32x6	20x6.00D
International A 5	3	2550	Own	H	6	3⅝x4½	279.0	31.5	65@2800	G	Mod	Own	Mec	Ross	Zen	Vac	DR	Own	5	Own	Sp	52.6	BE4IM	430	156	5606	34x7	32x6D
International A 6	3	2675	Own	H	6	3⅝x4½	279.0	31.5	65@2800	G	Own	Own	Own	Own	Zen	Vac	DR	Own	5	Own	2 R	60.5	BE4IM	430	156	5750	34x7	34x7D
International W 1	2½	3850	Hall	H	4	4¼x5½	312.0	28.9	54@1800	C	Own	Own	Own	Own	Zen	Vac	RB	Own	5	Own	2 R	70.5	——	710	148	8300	36x8S	36x7D
International W 3	3½	4850	Hall	H	4	4¾x5½	390.0	36.1	60@1800	C	Own	Own	Own	Own	Zen	Vac	RB	Own	5	Own	2 R	70.5	——	——	160	10125	36x6S	36x8S
																												40x12S
La France Rep. A 1	6000	795	Lyc	L	4	3 x4¾	201.5	21.5	60@2500	G	G & O	Borg	Spic	Han	Zen	Vac	Aut	Ful	4	Tim	Sp	36.1	L4IH	378	132	3000	20x5.50	32x6
La France Rep. C 1	7500	1295	Lyc	L	6	3¼x4½	224.0	25.4	61@2750	G	G & O	Eorg	Spic	Han	Zen	Vac	Aut	Ful	4	Tim	Sp	29.1	L4IH	413	144	3300	20x6.00	32x6
La France Rep. D 1	9000	1595	Lyc	L	6	3¼x4½	224.0	25.4	61@2750	G	G & O	Borg	Spic	Han	Zen	Vac	Aut	Ful	4	Tim	Sp	37.9	L4IH	448	144	3725	30x5	32x6
La France Rep. F-3	13000	2395	Lyc	L	6	3¼x4½	224.0	25.4	61@2750	G	Per	Ful	Spic	Han	Zen	P	Aut	Ful	4	Wis	2 R	41.6	L4IHV	628	174	5520	34x7	34x7D
La France Rep. H 2	16000	2985	Lyc	L	6	3¾x4½	299.0	33.7	80@2500	G	Per	Ful	Spic	Han	Zen	P	Aut	Ful	4	Wis	2 R	48.1	L4IHV	658	174	6370	34x7	34x7
La France Rep. M 2	20000	4000	Wak	L	6	3⅞x5	354.0	36.0	85@2300	G	Per	Ful	Spic	Han	Zen	P	Aut	Ful	5	Wis	2 R	45.4	L4IHV	768	174	7500	36x8	34x7D
La France Rep. 35-2	24000	5600	Wak	L	6	4⅜x5½	462.0	46.0	97@2000	G	Per	Ful	Spic	Han	Zen	P	Aut	Ful	4	Wis	2 R	48.1	L4IHV	870	174	9250	38x9	36x8D
																												38x9D
Macear 36 A	1½	1900	Bud	L	6	3¾x4½	298.0	33.7	83@2800	G	Per	Br-L	Spic	Ross	Str	P	DR	Br-L	4	Tim	Sp	30.6	L4IH	315	171	4850	32x6	
Macear 40 A	2	2400	Bud	L	6	3¾x4½	298.0	33.7	83@2800	G	Per	Br-L	Spic	Ross	Str	P	DR	Br-L	4	Tim	Sp	38.8	L4IHV	325	171	5340	32x6	32x6D
Macear 56	3	3350	Bud	L	6	3¾x5	311.0	33.7	72&2100	G	Per	Br-L	Spic	Ross	Str	Vac	DR	Br-L	4	Wis	2 R	37.4	L4IHV	411	183	6200	34x7	32x6D
Macear 60	3	3950	Bud	L	6	4⅛x5⅛	411.0	40.8	103@2100	G	Per	Br-L	Spic	Ross	Zen	Vac	DR	Br-L	7	Tim	We	34.3	L4IHV	411	183	6600	34x7	34x7D
Macear 66 A	4	5500	Her	L	6	4⅜x4¾	479.0	51.3	106@2100	G	Per	Br-L	Spic	Ross	Zen	Vac	DR	Br-L	7	Tim	We	64.5	W4IA	617.5	206	8200	20x9.00	20x9.00D
Macear 86 A	5	5950	Her	L	6	4⅜x4¾	479.0	51.3	106@2100	G	Per	Br-L	Spic	Ross	Zen	Vac	DR	Br-L	7	Tim	Wo	72.3	W4IA	623	206	9500	20x9.75	20x9.75D
†Macear SW-86	10	7650	Her	L	6	4⅜x4¾	479.0	51.3	106@2100	G	Per	Br-L	Spic	Ross	Zen	Vac	DR	Br-L	7	Tim	Wo	72.3	T6IA	103	206	11700	20x10.50	20x10.50D
																										20x9.75	20x9.75D
††Mack B L	——	2500	Own	L	6	3½x5	248.9	25.3	63@2800	G	Own	Own	Spic	Gem	Str	Vac	NE	Own	4	Tim	Sp	——	——	302	148	——	20x6.00B	20x6.00DB
††Mack A B	——	3000	Own	L	6	3⅝x5	309.6	31.5	75@2600	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	Sp	Opt	O41V	415	156	——	32x6	32x6D
Mack A B	——	4350	Own	L	4	4¼x5	283.7	28.9	60@2200	G	Own	Own	Spic	Own	Str	Gra	NE	Own	4	Own	2 R	Opt	O41V	471	146½	——	34x7	34x7D
Mack A B	——	4000	Own	L	4	4¼x5	283.7	28.9	60@2200	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	Ch	Opt	O41V	471	146½	——	34x7	34x7D
††Mack A B	——	4500	Own	L	6	3⅝x5	309.6	31.5	75@2600	G	Own	Own	Spic	Own	Str	Gra	NE	Own	4	Own	2 R	Opt	O41V	471	146½	——	34x7	34x7D
††Mack B C	——	4150	Own	L	6	3⅝x5	309.6	31.5	75@2600	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	Ch	Opt	O41V	471	146½	——	34x7	34x7D
††Mack B C	——	5250	Own	L	6	3⅝x5	309.6	31.5	75@2600	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	2 R	Opt	O41V	471	146½	——	34x7	34x7D
††Mack B J	——	5500	Own	L	6	4 x5½	417.7	38.4	100@2300	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	Ch	Opt	O41V	610	154	——	34x7	34x7D
††Mack A K	——	6150	Own	L	6	4 x5½	417.7	38.4	100@2300	G	Own	Own	Spic	Own	Str	Vac	NE	Own	4	Own	2 R	Opt	O41V	610	154	——	36x8	36x8D
	——	5150	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Vac	L-N	Own	4	Own	Ch	Opt	O41V	567	168½	——	36x8	36x8D
††Mack A K	——	5250	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	2 R	Opt	O41V	492	162	——	36x8	36x8D
††Mack A C	——	4950	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	2 R	Opt	O41V	——	——	——	36x8	36x8D
††Mack A C	——	6450	Own	L	6	4½x5½	525.5	48.6	126@2200	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	Ch	Opt	O41V	492	162	——	36x8S	36x8DS
††Mack A C	——	5500	Own	L	6	4½x5½	525.5	48.6	126@2200	G	Own	Own	Spic	Own	Str	Vac	L-N	Own	4	Own	2 R	Opt	O41V	194	156	——	36x8S	36x8DS
††Mack A C	——	6550	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	Ch	Opt	O41V	492	174	——	36x8S	36x8DS
††Mack A C	——	6000	Own	L	6	4½x5½	525.5	48.6	126@2200	G	Own	Own	Spic	Own	Str	Vac	L-N	Own	4	Own	Ch	Opt	OJXM	194	156	——	22x10.50B	22x10.50DB
††Mack A K 6—6 wheel	——	9500	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	Ch	Opt	O41V	492	174	——	36x6S	40x6DS
††Mack A C 6—6 wheel	——	9500	Own	L	6	5 x6	706.5	60.0	150@2000	G	Own	Own	Spic	Own	Str	Vac	L-N	Own	4	Own	Ch	Opt	OJXM	194	156	——	24x10.50B	24x10.50DB
††Mack A C 6—6 wheel	——	7650	Own	L	4	5 x6	471.2	40.0	77@1800	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	Ch	Opt	O41V	492	174	——	36x7S	40x7DS
Mack A P 6 wheel	——	9000	Own	L	6	4½x5½	525.2	48.6	126@2200	G	Own	Own	Spic	Own	Str	Vac	L-N	Own	4	Own	2 R	Opt	O21V	287	191	——	36x7S	40x8DS
††Mack A P 6 wheel	——	11500	Own	L	6	5 x6	706.5	60.0	150@2000	G	Own	Own	Spic	Own	Str	Gra	RB	Own	4	Own	Ch	Opt	O61A	574	152-52	——	9.75x22B	5.75x22DB
	——	12000	Own	L	6	5 x6	706.5	60.0	150@2000	G	Own	Own	Spic	Own	Str	Vac	L-N	Own	4	Own	Ch	Opt	OR1V	574	125-52	——	36x6S	40x12S
																Gra	NE	Own	4	Own	Ch	Opt	O61A	574	145-52	——	40x8	40x8D
Paige	½	*895	Own	L	6	3⅛x4½	207.0	23.4	66@3200	C	Long	Long	Un	Ross	DL	I	DR	—	3	——	Sp	14.2	41H	574	145-52	——	40x8	40x8D
																												40x8D
Pierce-Arrow P T	12000	2950	Own	L	6	3¾x4½	298.0	33.5	70@2600	G	Long	Long	Cle	Han	Zen	P	DR	Cla	4	Tim	Sp	——	B4IMV	264	115	2350	22x9.75B	22x9.75B
Pierce-Arrow P W	18000	4150	Own	L	6	4⅛x4½	361.0	40.3	77@2400	G	Long	Long	Cle	Han	Zen	P	DR	Cov	4	Tim	*Wo	——	W4IA	388	160	5600	18x5.50B	18x5.50B
Pierce-Arrow P X	24000	5375	Own	L	6	4⅜x4¾	479.0	51.3	103@2200	G	Long	Long	Cle	Han	Zen	P	DR	Cov	4	Tim	Wo	——	W4IA	488	150	6660	20x7.50B	20x7.50B
Pierce-Arrow P Y	28000	5950	Own	L	6	4⅜x4¾	479.0	51.3	103@2200	G	Long	Long	Cle	Han	Zen	P	DR	Cov	4	Own	*Wo	——	W4IA	610	160	9300	20x9.00B	20x9.00B
Pierce-Arrow P Z	34000	6950	Own	L	6	4¾x5¾	611.0	54.1	130@2000	G	Long	Long	Cle	Han	Zen	P	DR	Own	4	Own	*Wo	——	W4IA	701	160	10675	20x10.50B	20x10.50B
																								702	168	12800	24x10.50B	24x10.50B
																										36x7B	40x16B
Relay Series 15 AA	¾	1370	Con	L	6	3⅜x4	214.7	27.3	52@2200	C	Long	Borg	Blo	Han	Str	Vac	Aut	W-G	4	Own	2R	38.4	L4IH	297	131	3750	30x5P	30x5P
Relay Series 15 AB	1	1400	Con	L	6	3⅜x4	214.7	27.3	52@2200	C	Long	Borg	Blo	Han	Str	Vac	Aut	W-G	4	Own	2R	38.4	L4IP	297	131	3800	30x5P	30x5P
Relay Series S 11	1	1700	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	30.0	L4IH	297	142	4050	30x5P	30x5P
Relay Series 40	1½	1900	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	25.5	L4IH	297	162	4500	30x5P	30x5P
Relay Series 40	1½	2990	Bud	L	6	3⅝x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	34.5	L4IH	394	168	5300	34x5P	34x5DP
Relay Series 50	2	3240	Bud	L	6	3⅝x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	34.5	L4IH	394	168	5500	36x6	36x6D
Relay Series S 11	2	3860	Bud	L	6	3¾x5	331.0	33.7	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	30.0	L4IH	584	161	6800	36x6	36x6D
Relay Series 40	2	2030	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	5	Own	2R	34.5	L4IH	297	162	4700	32x6P	32x6DP
Relay Series 50	2½	3275	Bud	L	6	3⅝x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	34.5	L4IH	394	168	5700	36x6	36x6D
Relay Series 60	2½	4000	Bud	L	6	3¾x5	331.0	33.7	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Own	2R	58.5	L4IH	584	161	7000	36x6	36x7D
	2½	4555	Bud	L	6	4⅛x5⅛	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Own	2R	58.5	L4IH	584	175	7350	36x6	36x6D
Relay Series 50	3	4130	Bud	L	6	3¾x5	330.0	33.7	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	5	Own	2R	58.5	L4IH	584	161	7200	36x6	40x8D
Relay Series 60	3	4595	Bud	L	6	4⅛x5⅛	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Own	2R	58.5	L4IH	584	175	7500	36x6	38x7D
Relay Series 60	3½	5170	Bud	L	6	4⅛x5⅛	411.0	40.8	83@2100	G	Long	Borg	Blo	Ross	Zen	Vac	Aut	Cov	8	Own	2R	58.5	L4IH	584	175	7800	36x6	40x10S
Relay Series 80	3½	4745	Bud	L	6	4⅛x5⅛	410.9	40.8	83@

Major Specifications and Mechanical Details of 1931 Commercial Cars

(CONTINUED FROM PAGE NINE)

Make and Model	Capacity—Tons or Lbs.	Chassis Price	Engine	Valve Arr'g'm't	No. of Cyls.	Bore and Stroke	Piston Disp.	Tax H. P.	Max. Brake H. P. and Peak R. P. M.	Type Cam-shaft Drive	Radiator Make	Clutch Make	Universals Make	Steering Gear Make	Carburetor Make	Fuel Feed Type	Make Electr'l System	Make Transmission	No. Spds. For.	Rear Axle Make	Type Final Drive	Final Gear Reduction	Type Service Brakes	Area Service Brakes	Standard Wheel Base	Chassis Wgt.	Standard Tire Sizes Front	Rear
Selden 67 C	5	4975	Con	H	6	4⅜x4¾	427.0	45.9	100@2400	C	Own	Br-L	Spic	Ross	Str	Vac	Aut	Br-L	7	Wis	2R	——	L4IHVA	—	171	8700	36x8	36x8D
Selden 77	7	7365	Con	L	6	4¾x5¾	611.0	54.1	127@2300	G	Own	Br-L	Spic	Ross	Str	Vac	Aut	Br-L	7	Wis	2R	——	BW41M	—	178	11600	40x8	42x9D
Service Series S 11	1	1600	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Col	Sp	25.5	——	—	142	3900	30x5P	30x5P
Service Series S 11	1½	1900	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Sp	29.2	L4IH	297	162	4300	30x5P	30x5DP
Service Series 40	1½	2990	Bud	L	6	3⅝x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Wo	34.8	L4IH	394	168	4700	34x5P	34x5DP
Service Series S 11	2	2030	Bud	L	6	3⅜x4½	241.6	27.3	53@2200	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Sp	29.2	L4IH	297	162	4500	32x6	32x6D
Service Series 40	2	3240	Bud	L	6	3⅝x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Wo	34.8	L4IH	394	168	4900	36x6	36x6D
Service Series 40	2½	3240	Bud	L	6	3⅝x5	309.6	31.5	64@2100	G	Long	Br-L	Blo	Han	Zen	Vac	Aut	Br-L	4	Tim	Wo	34.8	L4IH	394	168	5100	36x6P	36x6D
Service Series 60	2½	4580	Bud	L	6	4⅛x5⅛	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Tim	Wo	63.0	L4IH	584	175	7000	36x6	36x6D
Service Series 60	3	4680	Bud	L	6	4⅛x5⅛	410.9	40.8	83@2100	G	Long	Ful	Blo	Han	Zen	Vac	Aut	Ful	5	Tim	Wo	63.0	——	—	175	7100	36x6	38x7D
Service Series 80	3½	5250	Bud	L	6	4⅛x5⅛	411.0	40.8	83@2100	G	Long	Borg	Blo	Ross	Zen	Vac	Aut	Br-L	7	Tim	Wo	98.2	——	—	175	8200	36x6S	36x12S
Service Series 80	4	5330	Bud	L	6	4⅛x5⅛	411.0	40.8	83@2100	G	Long	Own	Blo	Ross	Zen	Vac	Aut	Br-L	7	Tim	Wo	98.2	——	—	175	8400	36x6S	36x14S
Service Series 100	5	5830	Bud	L	6	4⅛x5⅛	410.9	40.8	83@2100	G	Long	Own	Blo	Ross	Zen	Vac	Aut	Br-L	7	Tim	Wo	95.0	——	—	175	9600	36x6S	40x14S
Sewart 30	1	695	Lyc	L	4	3¾x4½	199.0	22.5	50@2600	G	Fed	Borg	Spic	Ross	Str	P	DR	W-G	4	Sal	Sp	35.1	B4IM	: :	130	3158	20x6.50	20x6.50
Stewart 30X	1	795	Lyc	L	6	3 x4¾	185.0	23.8	60@2800	G	Fed	Borg	Spic	Ross	Str	P	DR	W-G	4	Sal	Sp	35.1	B4IM	: :	130	3199	20x6.50	20x6.50
Stewart 40	1½	895	Lyc	L	4	3¾x4½	199.0	22.5	50@2600	G	Fed	Borg	Spic	Ross	Str	P	DR	W-G	4	Cla	Sp	35.1	B4IM	: :	130	3531	20x6.50	20x6.50D
Stewart 40 X	1½	995	Lyc	L	6	3 x4½	201.5	23.8	60@2800	G	Fed	Borg	Spic	Ross	Str	P	DR	W-G	4	Sal	Sp	35.1	B4IM	: :	130	3574	20x6.50	20x6.50D
Stewart 34 X	1½	1195	Lyc	L	6	3¼x4½	224.0	25.3	61@2600	G	Own	Borg	Spic	Ross	Str	P	DR	W-G	4	Cla	Sp	35.1	B4IM	: :	145	3891	20x6.50	20x6.50D
Stewart 28 X	2	1495	Lyc	L	6	3¼x4½	224.0	25.3	61@2600	G	Own	Ful	Spic	Ross	Str	P	DR	Ful	4	Cla	Sp	44.1	B4IM	: :	136	4239	20x6.50	20x6.50D
Stewart 29 X S	2	1695	Lyc	L	6	3⅜x4½	278.0	25.3	85@2750	G	Own	Ful	Spic	Ross	Str	P	DR	Ful	4	Cla	Sp	44.1	B4IM	: :	145	4194	32x6	32x6D
*Stewart 19 X	2½	2690	Lyc	L	6	3⅜x5	310.0	31.5	85@2750	G	Own	Ful	Spic	Ross	Str	P	DR	Ful	4	Tim	Wo	48.1	B4IM	: :	165	6345	32x6	32x6D
Stewart 32 X	2½	1990	Lyc	L	6	3¾x4½	278.0	31.5	80@2500	G	Mod	Ful	Spic	Ross	Str	P	DR	Ful	4	Cla	Sp	46.1	B4IM	: :	165	5552	32x6	32x6D
Stewart 35 X	3	2590	Lyc	L	6	3¾x4½	299.0	33.8	85@2750	G	Fed	Ful	Spic	Ross	Str	P	DR	Ful	4	Cla	Sp	46.1	B4IM	: :	165	6224	20x8.25B	20x8.25D
Stewart 36 X	3	2990	Lyc	L	6	3⅞x5	354.0	36.2	90@2750	G	Fed	Borg	Spic	Ross	Str	P	DR	Br-L	4	Tim	Wo	105.1	B4IM	: :	165	6864	20x8.25	20x8.25D
Stewart 19 X	3½	3690	Lyc	L	6	3⅞x5	354.0	36.2	90@2750	G	Mod	Ful	Spic	Ross	Str	P	DR	Ful	12	Tim	Wo	105.1	B4IM	: :	165	7474	34x7	34.7D
Stewart 38-8	3½	3990	Lyc	L	8	3¾x4¾	462.0	44.4	130@2800	G	Fed	Borg	Spic	Ross	Str	P	DR	Br-L	12	Tim	2R	105.1	B4IMV	: :	170	7964	20x9.00	20x9.00D
Stewart 38-6	3½	3990	Wak	L	6	4⅜x5⅛	420.0	45.9	100@2000	G	Fed	Borg	Spic	Ross	Str	P	DR	Br-L	12	Tim	2R	105.1	B4IMV	: :	170	7964	20x9.00	20x9.00D
Stewart 31 X	5	4990	Wak	L	6	4⅜x5⅛	462.0	45.9	100@2000	G	Mod	Ful	Spic	Ross	Str	P	DR	Ful	8	Tim	Wo	105.1	B4IMV	—	165	9885	36x6S	36x6SD
Stewart 27 X	7	5700	Wak	L	6	4⅜x5⅛	462.0	45.9	100@2000	G	Own	Ful	Spic	Ross	Str	P	DR	Ful	8	Tim	Wo	105.1	B4IMV	—	165	10512	36x7	40x7D
Studebaker S-1	½	595	Own	L	6	3⅜x4⅛	221.0	27.3	70@3200	C	McC	Long	Spic	Ross	Str	P	DR	W-G	3	Own	Sp	16.4	B4IM	148	114	2897	19x5.25	19x5.25
Studebaker S-20	1½	695	Own	L	6	3¼x4⅛	205.0	25.4	70@3200	C	McC	Long	Spic	Ross	Str	P	DR	W-G	4	Tim	Sp	36.2	B4IM	224	130	2990	20x6.00	32x6
Studebaker S-30	1½	775	Own	L	6	3¼x4⅛	205.0	25.4	70@3200	C	McC	Long	Spic	Ross	Str	P	DR	W-G	4	Tim	Sp	36.2	B4IM	224	160	3145	20x6.00	32x6
Studebaker S-40	2	945	Own	L	6	3¼x4⅛	205.0	25.4	70@3200	C	McC	Long	Cle	Ross	Str	P	DR	W-G	4	Tim	Sp	37.4	B4IM	276	136	3775	20x6.50	20x6.50D
Studebaker S-50	2	895	Own	L	6	3¼x4⅛	205.0	25.4	70@3200	C	McC	Long	Cle	Ross	Str	P	DR	W-G	4	Tim	Sp	37.4	B4IM	276	148	3805	20x6.50	20x6.50D
Studebaker S-60	2	945	Own	L	6	3¼x4⅛	205.0	25.4	70@3200	C	McC	Long	Cle	Ross	Str	P	DR	W-G	4	Tim	Sp	37.4	B4IM	276	160	3800	20x6.50	20x6.50D
Studebaker 88	——	3295	Own	L	8	3½x4⅜	337.0	39.2	115@3200	G	Long	Long	Spic	Ross	Str	P	DR	Ful	4	Eat	Sp	24.6	B4IMV	444	184	5413	20x7.50	20x7.50D
Studebaker 99	——	3795	Own	L	8	3½x4⅜	337.0	39.2	115@3200	G	Long	Long	Spic	Ross	Str	P	DR	Ful	4	Eat	Sp	24.6	B4IMV	505	184	5680	20x7.50	20x7.50D
White 15B	*7,500	1545	Own	L	4	3¾x5⅛	226.4	22.5	315@1600	G	Own	Own	Spic	Own	Zen	Vac	L-N	Own	4	Own	Sp	18.6	O2XM	226	133½	3402	30x5	30x5
White 160	*8,000	1700	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	Own	Mec	Han	Zen	Vac	DR	Own	4	Own	Sp	19.5	L4IH	276	138	4025	30x5	30x5
White 60	*8,000	1850	Own	L	6	3½x4½	260.0	29.4	54@2100	G	Own	Own	Mec	Han	Zen	Vac	DR	Own	3	Own	Sp	17.8	L4IH	276	138	3739	30x5	30x5D
White 161	*9,000	1850	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	—	Own	Mec	Han	Zen	Vac	DR	Own	4	Own	Sp	19.5	L4IH	276	138	4290	34x7	34x7
White 162	*10,000	1900	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	—	Own	Mec	Han	Zen	Vac	DR	Own	4	Own	Sp	19.5	L4IH	276	138	4360	30x5	30x6D
White 210	*10,000	2300	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	—	Own	Spic	Han	Zen	Vac	DR	Own	4	Own	Sp	22.4	L4IH	349	148	4875	30x5	30x6D
White 61	*10,500	2450	Own	L	6	3¾x4½	299.0	33.7	61@2100	C	Own	Own	Spic	Han	Zen	Vac	DR	Own	4	Own	Sp	23.4	L4IH	349	148	4789	30x5	30x5D
White 611	*11,500	2550	Own	L	6	3¾x4½	299.0	33.7	61@2100	C	—	—	Own	—	Han	Zen	Vac	DR	Own	4	Own	Sp	23.4	L4IH	349	148	4889	20x7.00B	20x7.00DB
White 211	*11,500	2425	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	—	Own	Spic	Han	Zen	Vac	DR	Own	4	Own	Sp	23.4	L4IH	349	148	5110	32x6	32x6D
White 212	*13,000	2700	Own	L	4	4 x5¾	289.0	25.6	45@1800	G	—	—	Own	Spic	Han	Zen	Vac	DR	Own	4	Own	Sp	23.4	L4IH	349	148	5230	34x7	34x7D
White 56	*13,000	3125	Own	L	4	4 x5¾	289.0	25.6	45@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	Sp	26.2	O2IM	268	165	5276	36x4	36x7
White 612	*13,000	2800	Own	L	6	3¾x4½	299.0	33.7	61@2100	C	—	—	Own	—	Han	Zen	Vac	DR	Own	4	Own	Sp	23.4	L4IH	349	148	5100	20x7.50B	20x7.50DB
White 620	*15,000	4350	Own	H	6	4 x5¼	396.0	38.4	72@1800	G	Own	Own	Spic	Ross	Zen	P	DR	Own	4	Own	Sp	41.8	O14IHV	—	157	7300	20x8.25B	20x8.25DB
White 51A	*17,000	3750	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	Sp	35.6	O2IM	335	170	6438	36x5	36x8
White 51AT	*17,000	3875	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	Sp	46.6	O2IM	335	134	6227	36x5	36x8
White 621	*18,000	4650	Own	H	6	4 x5¼	396.0	38.4	72@1800	C	Own	Own	Spic	Ross	Zen	P	DR	Own	4	Own	Sp	41.4	OL4IHV	—	157	7700	20x9.00B	20x9.00DB
White 640	*20,000	6100	Own	H	6	4⅜x5¾	519.0	45.9	96@1800	C	Own	Own	Spic	Ross	Zen	P	L-N	Own	4	Own	Sp	33.9	O4IA	—	180	9200	20x9.00B	20x9.00DB
White 630	*20,000	5000	Own	H	6	4 x5¼	396.0	38.4	72@1800	C	—	—	Own	Spic	Ross	Zen	P	DR	Own	4	Own	Sp	41.4	O4IHV	554	168	8500	20x9.00B	20x9.00DB
White 55	*21,500	4650	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	2R	66.1	OPXM	224	174	8737	36x5	40x5D
White 58	*22,000	4400	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	2R	49.7	OPXM	224	180	7797	36x5	36x5D
White 641	*24,000	6450	Own	H	6	4⅜x5¾	519.0	45.9	96@1800	C	Own	Own	Spic	Ross	Zen	P	L-N	Own	4	Own	2R	46.9	O4IA	—	180	9700	20.9.75B	20x8.25DB
*White 630 SW200	*24,000	6280	Own	H	6	4 x5¼	396.0	38.4	72@1800	C	—	—	Own	Spic	Ross	Zen	P	DR	Own	4	Tim	Wo	44.2	OT1HV	—	193	10000	20x8.25B	20x8.25DB
White 631	*24,000	5750	Own	H	6	4 x5¼	396.0	38.4	72@1800	C	Own	Own	Spic	Ross	Zen	P	DR	Own	4	Own	2R	56.9	O4IHV	—	168	9000	20x9.25B	20x9.25DB
White 52	*28,000	5100	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	2R	53.4	OPXM	224	174	9469	36x6	40x12
White 52T	*28,000	4700	Own	L	4	4¼x5¾	326.0	28.9	54@1600	G	Own	Own	Spic	Own	Zen	Vac	Eis	Own	4	Own	2R	75.5	OPXM	224	129½	8461	36x5	40x5D
White 643	*32,000	6950	Own	H	6	4⅜x5¾	519.0	45.9	96@1800	C	Own	Own	Spic	Ross	Zen	P	L-N	Own	4	Own	2R	66.5	O4IA	—	180	10900	24x10.50B	24x10.50DB
*White 642 SW310	*34,000	8045	Own	H	6	4⅞x5¾	519.0	45.9	96@1800	C	—	—	Own	Spic	Ross	Zen	P	L-N	Own	4	Tim	Wo	66.6	OT1HV	—	198	12670	20x9.00B	20.9.00DB
White 642	*34,000	6750	Own	H	6	4⅜x5¾	519.0	45.9	96@1800	C	Own	Own	Spic	Ross	Zen	P	L-N	Own	4	Own	2R	66.5	O4IA	—	180	10600	24x9.75B	24x9.7bDB
*White 643 SW410	*40,000	8570	Own	H	8	4⅜x5¾	519.0	45.9	96@1800	C	—	—	Own	Spic	Ross	Zen	P	L-N	Own	4	Tim	Wo	66.9	OT1HV	—	198	14400	40x8	40x8D
**White 60K	——	2200	Own	L	6	3½x4½	260.0	29.4	54@2100	C	—	—	Own	Mec	Han	Zen	Vac	DR	Own	3	Own	Sp	17.6	L4IH	276	112	3200	20x7.00B	20x7.00B
White 601	——	1900	Own	L	6	3½x4½	260.0	29.4	54@2100	C	—	—	Own	Mec	Han	Zen	Vac	DR	Own	4	Own	Sp	19.5	L4IH	276	138	3823	20x7.00B	20x7.00B
White 602	——	2050	Own	L	6	3½x4½	260.0	29.4	50@1800	C	—	—	Own	Mec	Han	Zen	Vac	DR	Own	4	Own	Sp	19.5	L4IH	276	138	4125	20x7.50B	20x7.50B
Willys 6-C-113	½	395	Own	L	6	3¼x3⅞	193.0	25.3	65@3400	C	Fed	Borg	Spic	Own	Til	P	Aut	Own	3	Own	Sp	12.4	B4IM	143	113	1923	19x5.00	19x5.00
Willys 6-C-131	1½	595	Own	L	6	3¼x3⅞	193.0	25.3	65@3400	C	Fed	Borg	Spic	Own	Til	P	Aut	W-G	4	Cla	Sp	40.8	B4IM	235	131	2625	20x5.50	32x6
Willys 6-C-157	1½	630	Own	L	6	3¼x3⅞	193.0	25.3	65@3400	C	Med	Borg	Spic	Own	Til	P	Aut	W-G	4	Cla	Sp	46.8	B4IM	235	157	2900	20x5.50	32x6

GENERAL NOTATIONS

***REFERENCE MARKS** apply to individual lines only and explanations are given under the subdivision for each company in the "SPECIAL NOTATIONS."

CAPACITIES given in this table are in tons or fractions of tons. *Shows maximum allowable gross weight in pounds.

WHEEL BASES given are standard, but optional wheel bases are available in many cases.

CHASSIS WEIGHT—Unless otherwise specified includes gas, water, oil, etc.

ENGINE—Bud, Buda; Con, Continental; Her, Hercules; Lyc, Lycoming; Pont, Pontiac; Wak, Waukesha; Wis, Wisconsin; Hall, American Car & Foundry.

VALVE ARRANGEMENT—L, "L" head; H, in head; O, overhead; T, T head; S, sleeve.

TYPE OF CAMSHAFT DRIVE—G, gear; C, chain.

RADIATOR MAKE—G & O, G & O Mfg. Co.; Per, Perfex Corp.; Long, Long Mfg. Co.; Har, Harrison Radiator Corp.; Fed, Fedders Mfg. Co.; McC, McCord Radiator & Mfg. Co.; Mod, Modine Mfg. Co.; Hex, Hexcel Radiator Co.

CLUTCH MAKE—Jon, Jones Clutch & Gear Co.; Ful, Fuller & Sons Mfg. Co.; Borg, Borg & Beck Co.; Br-L, Brown Lipe Gear Co.; Rock, Rockford Drill & Machine Co.; Cov, Covert Gear Co.; Long, Long Mfg. Co.; Detr, Detroit Gear & Machine Co.; Mer, Merchant & Evans; Hel, Merchants & Evans.

UNIVERSALS MAKE—Spic, Spicer Mfg. Co.; Blo, Blood Bros. Machine Co.; Sup, Superior Universal Products; Un, Universal Products Co.; Cle, Cleveland Steel Products Corp.; Pet, Peters; Opt, optional; Mec, Mechanics Machine Co.

STEERING GEAR MAKE—Ross, Ross Gear & Tool Co.; Han, Hannum Mfg. Co.; Sag, Saginaw Steering Gear Co.; Gem, Gemmer Mfg. Co.; Col, Columbus Gear & Pump Co.; W-G, Warner Gear Corp.

CARBURETOR—Car, Carter; Mar, Marvel; Sch, Wheeler-Schebler; Str, Stromoerg; DL, Detroit Lubricator; Til, Tillotson; Zen, Zenith-Detroit.

FUEL FEED—Gra, gravity; Vac, vacuum tank; P, fuel pump.

ELECTRICAL SYSTEM—AB, American-Bosch; Aut, Electric Auto-Lite; Eis, Eisemann; L-N, Leece-Neville; NE, North East; RB, Robert Bosch; DR, Delco-Remy.

TRANSMISSION—Br-L, Brown-Lipe; Cov, Covert; Ful, Fuller; Mec, Mechanics Machine; Mun, Muncie; W-G, Warner Gear; Cot, Cotta Gear Co.; Cla, Clark Equipment Co.

REAR AXLE, Cla, Clark Equipment; Col, Columbia; Eat, Eaton; Pont, Pontiac; Sal, Salisbury; Tim, Timken; Wis, Wisconsin.

FINAL DRIVE—IG, internal gear; St, straight bevel; Sp, spiral bevel; Wo, worm; 2R, double reduction; Ch, chain; S-T, semi-transverse.

TIRES—B, balloon; D, dual; S, solid; P, pneumatic.

TYPE OF SERVICE BRAKES—B4IM, Bendix, 4 wheel, internal mechanical; B6IA, Bendix, 6 wheel, internal air; B4IMV, Bendix, 4 wheel, internal mechanical, vacuum; BrIA, Bendix, operating on 4 rear wheels, internal air; BW4IM, Bendix front, Wisconsin rear, 4 wheel internal, mechanical; BE4IM, Bendix front, Eaton rear, 4 wheel, internal mechanical; BO4IM, Bendix front, own rear, 4 wheel internal mechanical; B4IH, Bendix, 4 wheel, internal hydraulic; B4, Bendix, 4 wheel.

C4IM, Columbia, 4 wheel, internal, mechanical; K2IM, Clark, 2 wheel, internal, mechanical.

L4IHVA, Lockheed, 4 wheel, internal, hydraulic, vacuum, air; LO4ID, Lockheed, own, 4 wheel, internal, drive shaft; LO4IV, Lockheed, own, 4 wheel, internal, vacuum; LT4DV, Lockheed Timkin, 4 wheel, drive shaft, vacuum; L4IH, Lockheed, 4 wheel, internal, hydraulic; L4IHV, Lockheed, 4 wheel, internal hydraulic, vacuum; LT4IVA, Lockheed, Timken, 4 wheel, internal, vacuum, air; L6IHV, Lockheed, 6 wheel, internal, hydraulic, vacuum; L6IH, Lockheed 6 wheel, internal, hydraulic.

O2IM, Own, 2 wheel, internal, mechanical; O2IV, Own, 2 wheel, internal, vacuum; O4IA, Own, 4 wheel, internal, air; O4IM, Own, 4 wheel, internal, mechanical; O4IV, Own, 4 wheel, internal, vacuum; O4M, Own, 4 wheel, mechanical; O2XM, Own, 2 wheel, external, mechanical; O4XM, Own, 4 wheel, external, mechanical; OJXM, Own, jack shaft, external, mechanical; OL4IH, Own, Lockheed, 4 wheel, internal, hydraulic; OPX, Own, propeller shaft, external, mechanical; OPM, Own, propeller shaft, mechanical; ORIV, Own, rear wheels, internal, vacuum.

S4IM, Steeldraulic, 4 wheel, internal, mechanical.

T4rIA, Timken, operating on 4 rear wheels, internal, air; T4IA, Timken, 4 wheel, internal, air; T6IA, Timken, 6 wheel, internal, air; T2IMV, Timken, 2 wheel, internal, mechanical, vacuum.

W4I, Westinghouse, 4 wheel, internal; W4IA, Westinghouse, 4 wheel, internal, air. W6IA, Westinghouse 6 wheel, internal, air. 4IA, 4 wheel, internal, air; 4IH, 4 wheel, internal, hydraulic; 4M, 4 wheel, mechanical.

SPECIAL NOTATIONS

AMERICAN-LA FRANCE

*Chief model also available as 2½-ton model, 34x7 tire, dual rear; weight, 6,400. Price, $3,900.

Chieftain model also available as dump truck, 160-inch wheel base.

Balloon tires optional on Chief, Chieftain and Big Chief models.

AUTOCAR

*Engines in these models are located under the driver's seat.

BROCKWAY

*Six-wheelers.

CHEVROLET

Utility model available on 131-inch wheel base with chassis weight of 2,760 pounds and equipped with dual rear wheels.

DAY ELDER

*Six-wheeler.

Additional standard wheel bases are available on different models as follows:

85	146, 168	240	204
110	168, 186	285	204
130	163, 187, 193	345	204
150	165, 180, 204	402	204

DODGE

*Models F40, F41, F61 and F62 can be had with double drop frame.

DIAMOND T

*Six-wheelers.

Additional standard wheel bases available as follows:

551	158	750	167, 192
504	166½	801	180½, 199⅛
506	174	1200	174½, 180
603	157, 179	1600	174½, 180
606	177½	1601	184

F. W. D.

*Indicates six-wheel model.

The BTL and BT models are special line construction trucks in which complete provision for mounting AT and T earth boring machine, winch, body and other line construction accessories is included in the standard chassis.

Special power take-off transmission, which provides 3 power take-offs which may be operated in any transmission speed, optional on all models.

FEDERAL

*Six-wheelers.

†Solid tires standard, no spare rim or tire.

FORD

Chassis weight given does not include gas, water, oil, etc.

GRAMM

Series	Straight Rating	Wheel Base	Pay Load Range
AX 4	8,000	157	1 to 1½ tons
AX 6	8,000	157	1 to 1½ tons
BX 4	10,000	157	1½ to 2 tons
BX 6	10,000	157	1½ to 2 tons
CX 4	12,000	157-180	2 to 3 tons
CX 6	12,000	157-180	2 to 3 tons
B	12,000	157-174	1⅝ to 2½ tons
C	14,000	145-196	2 to 3 tons
D	17,000	145-196	2½ to 4 tons
E	20,000	145-196	3 to 4½ tons
EY			3 to 4 tons
GY			4 to 5 tons
GW	28,000	157-240	5 to 7½ tons
HY			5 to 6½ tons

†Both the four and six cylinder are also offered in 157-inch wheel base at $1,145 and $1,345, respectively.

GENERAL MOTORS TRUCK

*Capacity indicated is the Straight Rating (combined weight of chassis, body, equipment and pay load) for which each chassis is designed and guaranteed to satisfactorily operate under average conditions. The size of the tires used does not affect this Straight Rating, but to secure maximum tire mileage it is suggested that the total gross weight be limited to a "recommended gross weight" for each tire equipment based on tire capacity. Prices cover base chassis and vary with wheel base and tire combinations. The number of wheel base lengths, tire types, range of "recommended gross weights" and resulting pay load range (assuming nominal body allowance) for each model follows:

Note: Models T-15 to T-60, inclusive, are available for export only as coach chassis.

Model	Wheel Bases	Tire Types	Range of Rec. Gross Weights	Pay Load Range
T-11	1	1	3800	½
T-15	3	10	4500- 6500	½-1½
T-17	2	8	5500- 6500	1-1½
T-19	3	22	6500- 8500	1½-2
T-25	3	17	6000- 9000	1½-2
T-26	4		8500-11000	2-3
T-30	3	16	10000-12500	2-3
T-31	4	..	11000-14000	2½-4
T-42	4	12	12000-15000	2½-4
T-44	4	12	12000-16000	3-4½
T-51	4	..	16500-19000	4-5½
T-55	4	..	16500-19000	4-5½
T-60	4	18	18500-22000	5-6½
T-61	4	..	19500-22000	5-6½
T-82	4	12	19000-24000	5-7
T-83	4	..	20000-24000	5-7
T-85	3	..	22000-26000	5-7
T-90	3	7	22000-28000	5-7½
T-95	3	..	28000-34000	7-9
T-96	3	..	28000-34000	7-9

†Models T-90, T-95 and T-96 are six-wheelers, the latter having one driven and one trailing axle. Optional rear axle gear ratios available for all models. Double reduction axles available for Models T-60, T-61 and T-82.

INDIANA

*Six-wheelers.

MACK

Other wheel bases furnished on all truck models.

On 6-wheel jobs 4 rear wheels driven by chains, foot brake on 4 rear wheels.

††Made also in tractor models.

PAIGE

*Price includes panel or screen body. Chassis weight given does not include gas, water, etc.

PIERCE-ARROW

*Optional final drive on Models PW, PX, PY and PZ.

REO

Models DF 129, DF, FA, FE and FF are available with duel wheels at additional cost.

*Models DF129 and DF 135 can be had with either 3 or 4 speed transmission.

SELDEN

Additional standard wheel bases are available on different models as follows:

Model 37C	162 and 181
39C	177 and 190½
47CB, 47CD	151, 164 and 184
67C	151, 164, 184 and 198

STEWART

Models 30 and 30X can also be supplied in 110, 120, 140 and 160-inch wheel base.

Models 40 and 40X can also be supplied in 110, 140 and 160-inch wheel base.

*Models 34X can be supplied in 135, 145, 160 and 176-inch wheel base.

Model 28X can be supplied in 130, 145, 160 and 176-inch wheel base.

Model 29XS can be supplied in 135, 160 and 176-inch wheel base.

*Models 18X, 32X and 36X can be supplied in 148, 190 and 220-inch wheel base.

*Models 19X, 31X and 27X can be supplied in 148, 172, 190, 220 and 235-inch wheel base.

As optional equipment Models 18X, 19X, 36X, 31X and 27X can be supplied with Timken dual reduction rear axle.

Models 38-8 and 38-6 can be supplied in 150, 160, 170, 196, 226 and 241-inch wheel base and worm axle.

STUDEBAKER

Maximum gross load, chassis, body and pay load for Model 88 to 12,500 pounds and for Model 99 is 14,000 pounds.

‡Hand brake same as foot brake, standard. Hand brake on drive shaft, special equipment.

WHITE

*Six-wheelers.

**Price on Model 60K includes body.

Foreign Trade Opportunities

Washington, D. C., July 9.—Foreign automotive trade opportunities just announced by the automotive division of the Bureau of Foreign and Domestic Commerce of the Department of Commerce are listed below.

Additional information may be obtained from the bureau and its district and co-operative offices by duly registered firms or individuals upon written request, giving

Insuring Wholesalers' Profits With Trucks

This report on economical truck operation in the wholesale field was prepared by the General Motors Truck Company, Pontiac, Mich., and is appearing in serial form in Automotive Daily News. Copies of this report in pamphlet form are now available at all General Motors Truck Company dealer and distributorships.

TIME lost at the loading platform often is the most serious source of loss encountered by the wholesalers' trucks. A few minutes lost two or three times a day at the loading platform by a group of trucks appears harmless enough, it is true. But when these time losses are added together, the total is often amazing.

For example, a check on the trucks of a wholesaler of hardware and automotive accessories in Illinois showed that the six trucks operated by this concern were averaging a loss of four hours or more each day at the loading platform. The record of a typical day's loading operation is shown in the accompanying chart. The time losses represent avoidable delays only, and do not include time consumed in the actual process of loading.

The principal cause of lost time at the loading platform for this wholesaler, and for many others, was unsystematic handling of the whole job of assembling and dispatching orders.

Salesmen brought in the great bulk of each day's orders late in the evening or early in the morning. Orders were then written up, dispatched to the warehouse, assembled, loaded and credit checked—all in the morning of the day of delivery. Only orders phoned in during the day or received by mail from out of town were handled during the day. In short, the great majority of orders scheduled for truck delivery were handled early in the morning while trucks waited.

Contrast this method of handling—which is all too common in wholesale establishments—with the more systematic method used by a wholesaler in an Ohio city:

Salesmen telephone in orders for truck delivery before 3 p. m. of the day preceding delivery.

Orders are then worked and assembled for loading before closing time the day preceding delivery.

Assembly and working of orders for truck delivery are given preference over other routine warehouse duties, except under exceptional circumstances. Each order is time stamped at the office, in warehouse departments and at the shipping platform, so that delays can be traced.

Two weeks after the wholesaler put this systematic plan into effect, he checked up on results.

Here is what had been accomplished:

Lost time had been reduced 75 per cent.

Customers received more prompt and more dependable service.

Two order fillers and loaders were dropped, because the loading peak in the early morning was reduced.

One truck was released each afternoon for depot hauling. Previously a truck was hired an average of two days a week for these afternoon depot hauls.

With less rush work demanded in the morning, errors in invoicing, order filling and loading were reduced 43 per cent.

The first year this plan was in effect, the wholesaler estimated his savings at $2,855. In addition to time losses from unsystematic assembly and dispatch of orders, there are a number of other common causes of delay at the loading platform. The most important of these are listed in the accompanying chart.

(TO BE CONTINUED)

TIME STUDY OF LOADING OPERATIONS

The following is a typical record of time losses for one day at the loading platform of an Illinois wholesaler:

Truck No.	First Trip. Min.	Second Trip. Min.	Third Trip. Min.	At End of Day. Min.	Total Loss. Min.
1	20	24	19	12	75
2	17	13	18	..	48
3	43	16	11	..	70
4	25	11	..	30	66
5	22	21	31	..	74
6	19	21	..	17	57
Total	146	106	79	59	390

ELIMINATING TIME LOSSES AT THE LOADING PLATFORM

CAUSES	WORKABLE SOLUTIONS
Delay in checking loads onto trucks	**Trucks are frequently delayed because there is only one shipping clerk or load checker to check loads onto trucks. A wholesaler of automobile accessories, located in Michigan, eliminated this type of delay by arranging for two bookkeepers to check loads during one or two peak hours of the day when the shipping clerk was busy. Total time savings for nine trucks averaged one hour and fifty-five minutes, without any appreciable loss to the bookkeeping department.**
Delay in preparing delivery tickets for drivers	**Many wholesalers make a practice of sending invoices back to the bookkeeping department for pricing after orders are worked and loaded. This is done to avoid the mistake of pricing items which are not in stock and cannot be delivered. The delay in pricing when several trucks are loading at one time often amounts to twenty minutes or more per truck on each trip. Frequently this policy also places an extra burden on the bookkeeping department during rush loading hours.** **Several wholesalers eliminate lost time from this source by providing space at the bottom of their invoice for deducting the cost of out-of-stock items from the total. The load checker made these deductions when loading was completed.** **A wholesaler of electrical supplies, in Missouri, determined that it was cheaper to mail invoices to customers than to send them with the delivery. He found that the cost of delaying his trucks, plus the extra expense in his bookkeeping department, and the cost of errors due to hasty pricing, more than offset the cost of mailing invoices to established accounts.**
Delays from slow order filling	**Some wholesalers follow the practice of giving orders one at a time to the porters or order fillers, permitting them to travel between two or three floors to fill one small order. The time required to fill orders always is excessive when this plan is used.** **A faster procedure is to make a copy of every order for each floor or department. Then all merchandise from one source can be assembled and trucked to the loading platform at one time. The saving in truck time invariably will more than pay for the cost of making the extra copies of orders.**
Delay in sorting loads on the platform	**When merchandise is brought from stock to the loading platform with no identification other than the label on the package, loading frequently is slowed up while drivers and helpers walk about looking for individual items.** **A wholesaler of drugs in a southern state reduces this type of delay by noting on each order the number of the truck which will deliver it, and then assigning an arbitrary stop number to each order. The truck number and the stop number then are marked on the merchandise or the tag by the order filler. This aids drivers in identifying each order on the loading platform.**
Delay because of truck and platform set-up	**When the loading platform is higher or lower than the floor of the truck body, trucks lose several minutes each trip because merchandise must be lifted or lowered to the truck.** **If the difference in height is so great that a change in the truck body will not correct the situation, it may pay to alter the loading platform so that hand trucks can be pushed onto the truck bed. When the difference is six inches or less, it usually is feasible to provide inclines which will permit easy access to the body.**
Delays caused by last minute orders	**Wholesalers' trucks frequently are kept waiting fifteen to thirty minutes for orders received at the last minute.** **Some urgent, last minute orders are to be expected, but many wholesalers find that they can reduce the number and thus save valuable truck time by one of the following methods: (1) Instructing clerks always to arrange for delivery on a later trip, if possible; (2) sending the order on a truck which will leave later for an adjacent route. Many delays of this sort can be avoided by a little quick planning on the part of the clerks.**
Delay in "checking-in" at end of each trip	**In some wholesale establishments drivers lose considerable time waiting for some one to check in returned goods, pick-ups and C. O. D. money when they return from a trip.** **This delay can be prevented by authorizing more than one individual—either in the shipping department or bookkeeping department—to handle this detail.**

Are Dash Instruments A Danger Factor?

(Continued from Page 5)

the strain of driving and the more can the attention be directed to "safety first." Average speeds are rising, and will rise higher still, so that a premium is put upon time available for action.

Obviously, then, the instruments should be placed where they can most easily be read by the man concerned, and that place is as far ahead of the driver as possible, and as closely as possible along his normal sight line, while driving—the top of the radiator, in fact. The further away the instrument the less does eye focus have to be altered; the closer the instrument to the sight line, the less is the angle of sight deflection. There is nothing new in this. Temperature indicators have been successfully mounted on radiator caps.

My greatly respected friend, George H. Lanchester, M. I. A. E., the pioneer designer, for years past has had his clock mounted on the radiator cap, while another old friend, Eric W. Walford, M. I. A. E., a pioneer car owner, has recently had fitted to his car another equally sensible idea. Mounted on the dash in front of the windshield is a streamline casing. In the rear of this casing is fitted a speedometer, while the front incloses an electric horn. When on the road the driver seldom looks at this speedometer needle at all, because the dial is visible in "the tail of the eye." This particular instrument is immensely valuable on the type of car to which it is fitted, a fast and silent saloon which cruises at a high speed. The driver of such a car needs to know at times that he really has slowed down as much as he intended, for after running smoothly at 60 m. p. h., a speed reduced to 40 m. p. h. seems slow, whereas the speed actually suitable to the conditions is about 20 m. p. h.

Proof of Practicability

A stop-watch test, carried out on the lines already mentioned, of Mr. Walford's device showed a time of three-fifth second, which is much less than the average time recorded on the normal cars, so that there is definite proof that the idea is sound. The greater driving comfort of it has to be experienced to be believed. Actually the driver can read the speed more quickly than he can announce the fact at one time.

I had the notion that the way to get over the present bad visibility was to make small-bodied instruments with long pointers inclosed in glass cases and then to mount them low down in front of the glass of the windshield. This method would, I thought, allow subconscious or tail-of-the-eye reading, by day or night, by reason of the light of the head lamps giving an illuminated foreground. But tentative experiments in this direction soon showed me the extreme importance of eye focus. A common fly on a radiator cap is much more comfortable to gaze upon than a better-class fly on the end of one's nose. So I abandoned that notion as being no better than the present style of mounting.

From a practical point of view it is quite possible to mount the needed dials in an insulated compartment on the radiator top. One way is to make a neat, small case for them and blend it into the radiator design, so that the dials face rearwards. This method is illustrated. A second idea was to mount them on their backs, with their faces pointing to the sky, in a group at the forward end of the top of the bonnet. Then a suitably shaped mirror at the correct angle could be molded into the radiator design, and facing backward, would show the dial readings to the driver.

Mr. Lanchester has suggested that it would be feasible to scoop a slight hollow on the top of the bonnet, like Vauxhalls do at the sides, let this tapering hollow conform in its slope with the sight-line, and then mount the group of instruments in the back face of the top of the radiator. A vertical fin could be used to make sure that the top line of the bonnet was not apparently broken when seen in side view. By this method the instruments can be placed rightly; they are in view of the driver, but not an excrescence on the outside of the car. On the whole it should prove a better mechanical proposition to mount instruments close by the radiator than inside the body.

There is yet another point about moving these instruments away to their proper place. We could then have lockers or cupboards in the dash that were worth while, spaces large enough to take your hat. Mr. Walford's idea of these is shown in the illustrations.

It is necessary to keep the number of instruments at a minimum, as there will not be much room. I should choose these: Speedometer, thermometer, oil gauge, ammeter, petrol gauge. The speedometer must be one with a dial and a pointer, not a revolving drum. One takes a casual glance at a speedometer to see approximately what the speed is, so the angular position of the needle at a distance should be enough to warn the driver if he is doing 15, 30, 45 or 60 miles per hour. Similarly, the temperature indicator needs a dial and a pointer to show if the engine is running too cold or nearly boiling in traffic. Personally, I think that a telltale, a red-to-white disk, is all that is necessary in each case to tell us if the oil pressure is there, the generator charging or the petrol supply about to run out. On these lines a neat little instrument panel could be arranged with two circular dials and three horizontal telltale disks between them, and be mounted on the radiator. The clock might be left in the center of the dash or in the roof.

Since most modern finger-tip controls in the center of the steering wheel include the lamp switches, dip and switch and horn button, there remain only the ignition switch, the starter switch and the mixture control, if any, and even these could be disposed elsewhere in order to leave the dash completely free. And so, in the end, not only would the driver benefit in comfort and ease of handling, but some money might be saved in the assembling of the car, particularly as regards body mounting.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

SUBSTITUTE BUS LINE FOR TROLLEYS IN N. J.

Trenton, N. J., July 9.—Suspension of trolley service on the Pennington line of the Trenton Transit Company with substitution of buses has been approved by the Board of Public Utility Commissioners. The change goes into effect at once. It is the intention of the company to continue the operation of trolleys on Pennington Avenue as far as the loop at the Trenton-Ewing township line. Transfers will be issued at the customary 1-cent charge to passengers changing from one to the other means of transportation in either direction.

SUN OIL PLANS TO OPEN ITS NEW PLANT IN FALL

Hamilton, Canada, July 9.—The distributing plant which the Sun Oil Company is establishing at Burlington Street and Victoria Avenue, in this city, will be in operation early in the fall, and will employ about twenty-five men, according to word received today from J. J. Shafer, an official of the company.

Willys Gives Details Of New Willys-Knight 95

(Continued from Page 1)

crankcase ventilator. Its appearance from the front closely resembles the Willys-Knight 66-D.

The power plant of the 95 is a six-cylinder Knight engine, with a bore and stroke of 2 15-16 by 4¾. The piston displacement is 177.9 cubic inches. The N. A. C. C. horsepower rating is 20.7 and brake horsepower developed is 60 at 3,400 r. p. m. The compression ratio is 5.55 to 1. The engine is mounted on rubber.

This engine is the first produced by Willys-Overland to employ a six-port intake manifold. "Shielding" the forward part of the manifold also is said to aid in the even distribution of the gas and the practical elimination of condensation in the intake manifold. This shielding, it is claimed, holds the forward part of the manifold at the same temperature as the center and rear areas and overcomes practically all condensation in the gas fed to No. 1 and No. 2 cylinders. This condition is also aided by the use of built-in radiator shutter, thermostatically controlled.

Improved lubrication is a feature of the engine, the oil entering the bearing at the side with the oil groove carried around the entire lower half. The oil flows freely on the entire lower half of the bearing and is carried to the upper half by the travel of the shaft. All main, crankshaft and eccentric rod and connecting rod bearings employ this new design.

The back end of the connecting rod bearing is also of a new design. The babbitt is not chamfered at the ends of the bearings as heretofore, but is of uniform thickness for the entire length.

It is claimed that the crankcase ventilator functions so that oily vapors are drawn from the crankcase through the carburetor into the cylinders and provide additional lubrication for the upper areas of the sleeves and pistons.

More efficient cooling is provided through a greater water capacity in the block around the cylinders.

This engine is also equipped with the Float-O oil device, first introduced on the Willys cars in January. This takes the clean oil from the top of the crankcase supply instead of from the bottom as heretofore.

The pistons, equipped with three compression rings and one oil ring, are invarstrut type aluminum alloy with full floating pins. Connecting rods are constructed to provide full pressure lubrication to the piston pins. The pistons, instead of having two narrow supporting bars as used heretofore, have one heavy wide support or bar.

The eccentric rod bushings are babbitt lined on a thin steel wall back.

The diameter of the flywheel has been increased. Openings are found on each side of the flywheel housing, with the flywheel markings on both sides for timing. Formerly only one opening on the top of the housing was provided.

A Tillotson carburetor of new design and larger size than formerly used on a Knight engine of this size is employed, and is equipped with a new type A. C. silencer, air cleaner and flame arrester. Fuel is supplied by a cam-operated pump mounted on the side of the crank case.

The cellular type radiator holds three gallons. Fan is driven by a V-belt.

Auto-Lite battery ignition with semi-automatic spark control is used.

The clutch is a single plate dry-disc type. Provision is made to lubricate the clutch shaft bushing in the fly wheel from the outside.

Transmission has three speeds forward and one reverse. The main shaft is mounted on ball bearings; countershaft on bronze bushings.

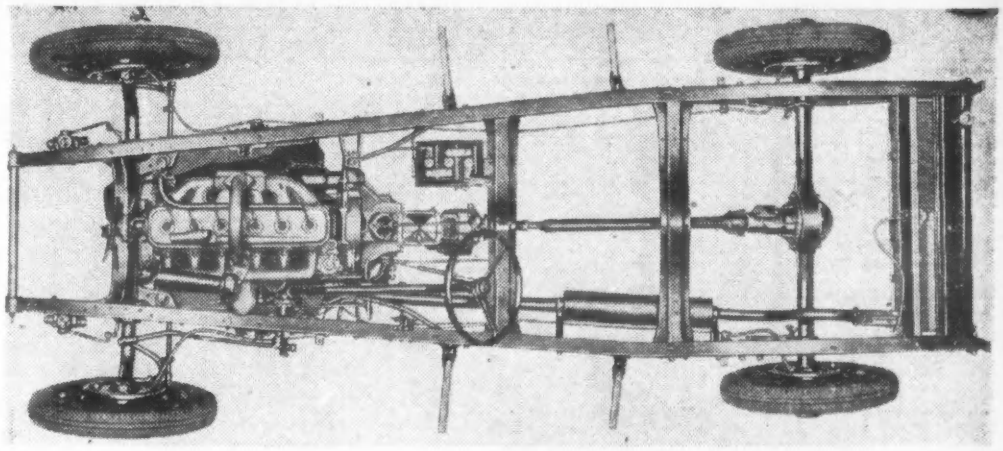
The free-wheeling device consists of a roller clutch unit mounted on the rear of the transmission and can be rendered operative either as a free-wheel or direct drive by a cable connection which goes from the free-wheel unit up to the instrument board, where it is connected to the lever on the instrument board. The lever terminates in a ball of the same size as that on the gearshift lever.

The rear axle is a semi-floating type with spiral bevel ring gear and pinion, which is mounted in a pressed steel banjo-type housing. Adjustable Timken bearings are used throughout. The propeller shaft uses universals on each end.

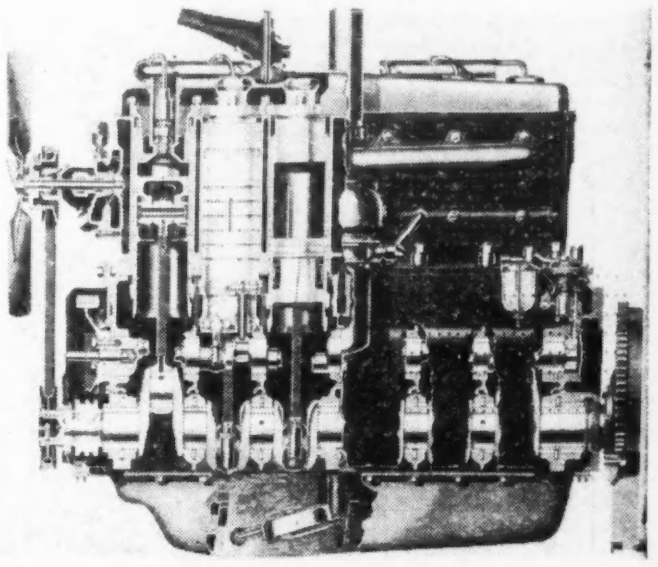
A double drop frame is used. The front axle is tubular.

Brakes are Bendix four-wheel, duo-servo, internal expanding, two shoe-self energizing type.

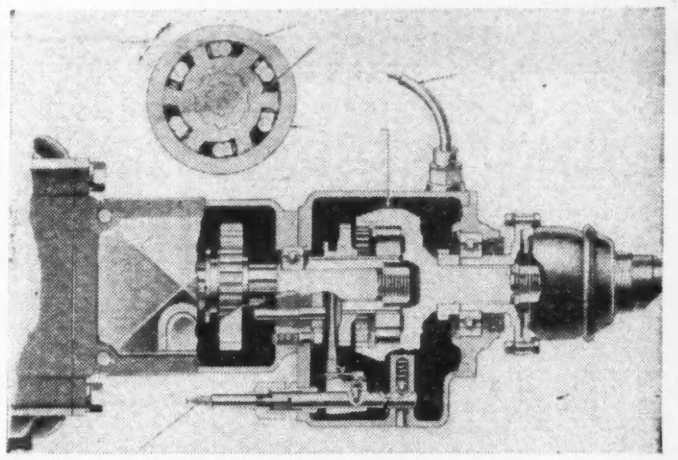
Other features include adjustable front seat, fore and aft and also inclination; finger-tip control, which has been used in other Willys-Overland products; safety glass at extra cost, anti-glare windshield, narrow corner posts at windshield, concealed wiring for lamps, hydrostatic gasoline gauge truck rack at rear, radiator filler cap concealed under hood, all-steel rear axle housing, drop center wire wheels and hydraulic shock eliminators.



PLAN VIEW of Willys-Knight 95 chassis



CUTAWAY VIEW of Willys-Knight 95 engine



SECTIONAL VIEW of free-wheeling mechanism used on new Willys-Knight 95

May Car Sales Were Close To April in Many States

NEW YORK, July 9.—New car registrations in May in the East were only 4.5 per cent. below April, in the Great Lakes region the seasonal decline was only 8.3 per cent., on the Pacific Coast, 8.6 per cent., and in the Rocky Mountain states, less than 1 per cent.

In some states, May sales exceeded those of the preceding month, while in many others there was little difference.

The following table shows May new car registrations, by geographical divisions, compared with the corresponding month of last year, and with April, 1931:

	May 1931	May 1930	April 1931
New England	23,779	30,452	27,967
East	69,413	88,838	72,717
South	44,438	59,291	45,617
Great Lakes	66,807	101,989	72,840
Middle West	16,814	29,494	19,408
Rocky Mts.	6,891	10,799	6,958
Pacific Coast	18,388	24,448	20,119

In New England the decline for April was 15 per cent. and from a year ago, 22 per cent. For the first five months of this year, new car registrations in this section of the country were 15 per cent. off. The totals for the first five months are given in the table at the end of this story.

In the East the decline in May from last year was 22 per cent. and for the first five months' the falling off was 20 per cent.

In the South the May seasonal drop was 25 per cent., while the decline from a year ago was 25 per cent. also. The falling off in the first five months was 35 per cent.

The decline in May in the Great Lakes states was 34 per cent. from a year ago and for the five months the drop was 33 per cent.

In the agricultural states of the Middle West the May decline from the preceding month was 13 per cent. and from a year ago 43 per cent. The five months' falling off was 41 per cent.

In the eight Rocky Mountain states May sales were 36 per cent. below May, 1930, and the five months' decline was 36 per cent.

On the Pacific Coast the decline in May from 1930 was 24 per cent. and the falling off in the five months was 28 per cent.

Following are the new car registrations by states, arranged geographically, for the first five months of this year, as compared with the corresponding period of 1930:

	1931	1930
NEW ENGLAND		
Connecticut	15,425	20,470
Maine	8,186	8,209
Massachusetts	45,537	55,523
New Hampshire	5,113	5,373
Rhode Island	6,333	7,867
Vermont	3,231	4,418
Totals	85,825	101,860
EAST		
Delaware	2,591	3,471
Maryland	14,304	19,004
New Jersey	42,949	50,133
New York	115,038	135,026
Pennsylvania	69,903	98,104
West Virginia	8,625	14,199
Totals	253,410	319,937
SOUTH		
Alabama	7,229	13,015
Arkansas	4,590	10,380
Florida	12,539	16,587
Georgia	13,246	14,198
Kentucky	12,904	19,942
Louisiana	7,740	13,256
Mississippi	4,584	11,360
Missouri	33,414	53,895
North Carolina	12,226	15,098
South Carolina	6,748	9,364
Tennessee	10,945	20,323
Texas	35,751	62,294
Virginia	16,933	22,773
Dist. of Columbia	10,949	8,926
Totals	189,798	291,911
GREAT LAKES		
Illinois	63,044	92,553
Indiana	30,224	43,404
Michigan	52,655	81,404
Minnesota	26,923	38,744
Ohio	58,501	86,727
Wisconsin	26,103	41,795
Totals	257,450	384,627
MIDDLE WEST		
Iowa	23,537	39,707
Kansas	14,486	22,538
Nebraska	14,341	21,661
North Dakota	4,653	7,051
Oklahoma	13,040	28,283
South Dakota	5,500	9,649
Totals	75,557	128,889
ROCKY MOUNTAINS		
Arizona	2,719	4,979
Colorado	9,745	14,948
Idaho	2,970	5,894
Montana	4,760	6,287
Nevada	1,051	1,593
New Mexico	2,031	3,437
Utah	3,260	5,473
Wyoming	2,044	2,529
Totals	28,580	44,840
PACIFIC COAST		
California	67,792	88,252
Oregon	7,557	11,796
Washington	11,250	20,285
Totals	86,599	120,333

WISCONSIN TAX BOOST ON TRUCK MILEAGE EFFECTIVE

Madison, Wis., July 9.—With the signature July 4 of the Eber bill by Gov. Phil La Follette, approximately $1,000,000 in new taxes will be derived by the state from an increase in the ton-mile tax on trucks and buses, which the measure authorizes.

The measure represents a compromise between the state and truck owners. It is a special levy made against trucks and buses because of the heavier use and greater wear these vehicles give highways as compared with other automobiles.

Under the new law bus and truck licenses are secured quarterly and the weight of vehicles is computed on licensed instead of maximum weight.

Buses with pneumatic tires are taxed one mill per ton mile, 1.25 mills if they weigh more than six tons, 1.5 if over seven tons, 1.75 if over eight and 2 if over nine. If buses have solid tires they pay 2 mills per ton mile, regardless of weight.

On freight trucks the tax is twice the amount of that charged buses having pneumatic tires and of the same weight. These taxes approximately double the present taxes. By a ton-mile is meant the traveling of one ton over one mile of highway.

SEARS CUTS PRICE OF COMPANION TIRE

Chicago, July 9.—Prices of the Companion tires sold by Sears, Roebuck & Co. are reduced 5 per cent., effective today. The reason given is a better demand for the tire than had been anticipated, making possible reduction in unit costs through larger scale production.

Dispatches from Akron indicated that the major tire companies would probably meet the cut by reducing their third grade tires. The move is considered of little significance as regards the industry as a whole, since most manufacturers are not interested in a third line, carrying them in small quantities only for dealers who require a cheap shoe.

NASH EARNINGS INCREASE; TO PAY $1 SHARE DIVIDEND

(Continued from Page 1)

The corresponding figures for the preceding quarter were $1,099,193.53.

In commenting upon the quarter's business President C. W. Nash drew attention to the fact that the company was practically out of operation for thirty days prior to going into production on the new line of cars, which was announced on June 28, and that it is also to be noted that considerable expense was incurred during the quarter in bringing the new line into production. The president stated that the new line announced on June 28 is meeting with popular favor, and, in his opinion, the third quarter should produce much better results than either the first or second quarter, owing to the fact that orders in hand are very satisfactory and sales are being made throughout the country in large volume. It is the opinion of the president and the board of directors that, having introduced a new line of cars with many improvements built in, the company's business should be increased to a point where the year 1931 should prove satisfactory to the stockholders.